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ADDENDA AND CORRIGENDA.

Page 21, line 24, for "*mirus*" read "*miris*"

28, line 9, for "*Hemithyreus*" read "*Oxythyreus*."

50, note.—A species of Popillia named *P. maculata* is described and figured by M. Guérin, in the "Voyage de Belanger," Plate II. fig. 3.

62, line 2, dele "Northern."

The species of *Rhomborhina* and *Coryphe* described in this paper have been illustrated in the first volume of the "Arcana Entomologica."

225, Figures and descriptions of *Trirogma cærulea* ♀, and of *Aphelotoma Tasmanica* ♂, will be found in the "Arcana Entomologica," No. 17.

231, line 5, for "*punctatus*" read "*punctatum*."

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Mr. G. Newport's Prize Essay upon *Athalia centifoliæ*, or the Black Catterpillar of the Turnip. With one plate. Price 1*s.*

TRANSACTIONS

OF THE

ENTOMOLOGICAL SOCIETY

OF

LONDON.

I. *Dytiscidæ Darwinianæ; or, Descriptions of the Species of* Dytiscidæ *collected by* Charles Darwin, *Esq., M.A. Sec. G. S. &c., in South America and Australia, during his Voyage in H.M.S. Beagle. By* Charles C. Babington, *M.A., F.L.S., F.G.S., &c.*

[Read 4th June, 1838.]

At the request of my friend Mr. C. Darwin, I have examined the species of *Dytiscidæ* collected by him during his voyage with Captain Fitzroy in the Beagle, and have now the honour of submitting the following descriptions of them to the Entomological Society. The specimens described very closely resemble some of those which are natives of the British isles: but, after a minute examination, a marked difference is always found to exist between them and any European insects.

Before proceeding to the descriptions, I propose to make a few observations; and in the first place I would draw attention to the *Cybister*, which I have named *2-ungulatus*. It has been observed by Erichson, Curtis, Stephens, &c., that this genus has only one immoveable claw to the posterior tarsi. Here (Pl. I. fig. 1 *a*, 1 *b*) we find two clearly distinguishable claws both immoveable, and apparently joined together at their base; or rather perhaps we ought to consider it as one claw very deeply divided into two parts. This insect also differs from the usual structure of the

genus in the proportions of the joints of its palpi and antennæ, the structure of its mandibles, and the singularly pitted elytra of the female. In the first group of the genus *Colymbetes* (*Rantus*, Eschsch.), we have a series of species closely allied to our *C. notatus* and *agilis*, but most of them at once distinguished from all the English species by the form of the apex of their elytra. In our native insects of this group, that part is uniformly rounded and obtuse, but in the South American specimens contained in this collection each elytron is obliquely truncate in such a manner as to form a sharp point at the suture (Pl. 1, fig. 2 *b*). The singular structure of the anterior claws of the males is worthy of notice, one of them being much longer than the other, broad, flattened, and fixed at a right angle with the last joint of the tarsi; the other slender and setaceous, and about a third part shorter (Pl. 1, fig. 2 *a*). This structure occurs in the claws of *C. notatus*, but in no other English species which I have had an opportunity of examining. In *C. angusticollis* will be found a form of thorax which has never before fallen under my notice in this genus. The species of *Hydroporus* will be observed to resemble closely some of those contained in our English cabinets, but yet to be clearly distinguishable from them.

At the conclusion of the paper, I have characterised three new generic forms of great interest; and as the species upon which they are founded are amongst the more minute of those contained in this family, and are nearly the first small water insects which have been brought from the tropics, I cannot but consider them as a proof of the very rich harvest which awaits the active and industrious collector, who may be induced to turn his attention to the minuter insects of those countries. The first, which I have denominated *Hydroporomorpha*, has the general appearance of an *Hydroporus*, closely resembling *H. oblongus*, Power (Steph. Ill. (M.) 5, p. 437), but it has a conspicuous scutellum; the structure of its labial palpi is quite different, having the three first joints very short, and the first joint of its internal maxillary palpi is longer than the second, not very short as in *Hydroporus*. The second new generic form (*Anodocheilus*, Bab.) also closely resembles a minute *Hydroporus*, from which it differs by the three basal joints of its external maxillary and labial palpi being transverse, and the terminal one emarginate, the first joint of the internal maxillary long and slender, and the second subulate, and by the want of the least trace of a tooth in the centre of the mentum. The third new genus (*Desmopachria*, Bab.) has the outward appearance of a minute *Hygrotus*, but is distinguished from that

genus by the great thickness and different form of the joints of its external maxillary and labial palpi, the slender short terminal joint of the internal maxillary, and its very short thick and curiously jointed antennæ.

In conclusion, I beg to express my great obligation to the Rev. F. W. Hope for the free use of his cabinet and library, and to J. O. Westwood, Esq., for his kind assistance in making the dissections and drawings for this paper.

DYTISCIDÆ DARWINIANÆ.

Cybister, *Curt.*

1. *C. 2-ungulatus*, Bab.

Olivaceo-niger, capite antice thoracis elytrorumque lateribus rufis; elytris postice latioribus impunctatis, sterni laciniis spathulatis; pedibus 4 anticis rufis, posticis bruneis, rufo-ciliatis, omnibus 2-dactylis. (Long. corp. 12-14; lat. 7-8½ lin.)

Olive black, ovate. Head olivaceous, with its anterior margin rufous; two small black foveæ in front, and two slender black lines extending diagonally from the antennæ towards the crown; no frontal lunule; impunctate except when greatly magnified, but then it is found to be, together with the thorax and elytra, covered with extremely minute punctures; labrum rufous; palpi and antennæ ferruginous. Thorax with an interrupted row of impressed dots on its anterior margin, an oblique one on both sides, and an abbreviated longitudinal dorsal channel, the lateral margins broadly rufous. Scutellum olivaceous; elytra ovate, posteriorly dilated, the exterior margin rufous, three rows of distant punctures upon each, and an irregular row of more minute ones on the exterior margin. Under side black, with a bright yellow spot at the posterior angles of the hinder sutures. The four anterior legs rufous, very short; posterior short and thick, particularly the tibiæ, dark; all the tarsi with two claws, but both those of the hinder pair appear to be immoveable, fringed internally with long rufous hairs. (Plate I. fig. 1 *a*, last joint of hind tarsi seen above; 1 *b*, ditto seen beneath.)

Hab. Maldonado, on the north coast of the Rio del Plata.

A forma typicali (*C. Roeselii*) hujusce generis insecta nostra differe videntur articuli basalis palporum maxillarium externorum antennarumque longitudine majori, elytris scrobiculatis fœminæ, mandibulis brevibus truncatis et oblique emarginatis tarsisque posticis ungulis duobus instructis.

Colymbetes (Rantus). *Steph. Brit. Ent.* (Mand.) 5, 393.

Rantus, *Eschsch.*

Colymbetes. *Erichs. Dytisc.* 32.

A. Elytrorum apice oblique truncato, acuminato.

a. Thorace postice multo latiori.

1. (2.) *C. reticulatus*, Bab.

Oblongo-ovatus, supra flavicans, subtus niger, vertice et thorace antice posticeque nigris, elytris crebre nigro-reticulatis striisque disci punctatis; antennis pedibusque pallidis, tarsis posticis nigris exceptis. (L. c. 5, lat. $2\frac{1}{2}$ lin.)

Oblong-ovate, yellow above. Head with the vertex broadly black, antennæ yellow. Thorax short, transverse, broadly emarginate in front, with prominent acute angles, the sides oblique and but slightly rounded, the posterior margin somewhat sinuated, the angles obtuse and slightly rounded, smooth, with a series of impressed dots on the anterior margin; disk immaculate, the anterior margin blackish, the posterior with a broad transverse black spot attached to its centre. Scutellum triangular, black, with its apex yellow. Elytra oblong, slightly dilated in the middle, the apex obliquely truncate so as to form a sharp point at the suture, slightly convex, with three lines of minute impressed dots upon each, which are scarcely distinguishable in the female, yellow, with the suture, apex, and numerous longitudinal lines connected by reticulations, black, leaving the exterior margin and a slender nearly continuous line next the suture yellow, the whole surface minutely strigose in the female. Body beneath black, with the abdomen somewhat fuscous. Legs yellow, the posterior tarsi alone excepted, which are black.

Hab. Valparaiso, Chili.

In this species, and all the others included in my Section A., the claws of the anterior feet (Pl. 1, fig. 2 *a*) are very large and unequal in the males. One of them is broad and flat, and forming an angle with the tarsi; the other slender, setaceous, and about a third part shorter. In the British species this structure occurs in *C. notatus*, Fab. and Steph. alone; and even there it is not so remarkable as in the species described in this paper. In all the other British species of *Rantus*, these claws, although very long, somewhat unequal in length, and forming an angle with the tarsi, are yet of exactly the same thickness and form. The oblique truncation of each elytron (Pl. 1, fig. 2 *b*), thereby forming a point at the suture, is a remarkable difference between these insects, and the allied European species.

2. (3.) *C. nigro-rematus*, Bab.

Oblongo-ovatus, supra flavicans, subtus niger, abdomine flavo, vertice nigro, elytris crebre nigro-reticulatis striisque disci punctatis; antennis pedibusque pallidis, tarsis posticis nigris exceptis. (L. c. $4\frac{1}{2}$; lat. $2\frac{1}{4}$ lin.)

Head, antennæ, and thorax as in the preceding insect; but the latter is wholly yellow, with the exception of two minute black spots on the hinder margin. Scutellum as in the last. Elytra the same, but the yellow outer margin is broader, and the reticulations are less regular. Breast black. Abdomen yellow, with the centres of the segments rather dusky. Legs pale, with the exception of the posterior tarsi, which are black.

There are two specimens of this insect in the collection; one from Port Famine, on the east coast of Patagonia, has smooth shining elytra, and all the appearance of a male insect, but it has not dilated tarsi; the other from Port Desire, on the same coast, has the strigose dull elytra, tarsi, &c. of a female. This species is closely allied to *C. reticulatus*, but may be distinguished by its pale thorax with two minute spots, and the pale abdomen. Can it be a variety of that insect?

3. (4.) *C. Chiliensis*, Laporte?

Oblongo-ovatus, supra flavicans, subtus niger, capite thorace antice postice maculâque oblongâ transversâ disci nigris, elytris crebrissimè nigro-reticulatis, striisque disci punctatis, antennis flavis extrorsum fuscis, pedibus fuscis. (L. c. $5\frac{1}{2}$; lat. $2\frac{3}{4}$ lin.)

C. Chiliensis, Lap. Etud. Ent. 100?

Head black, the anterior margin and labrum flavous. Antennæ flavous at the base, becoming gradually darker towards the apex. Structure of the thorax as in the preceding. The anterior and posterior margins black, and a large broad transverse rectangular black spot on the disk, between which and the base is a row of minute black dots. Scutellum totally black; elytra ovate, very slightly dilated, with the usual striæ, formed of few distant punctures, flavescent, very thickly reticulated with black; the lateral margins, and a very narrow line down the suture, immaculate. Body beneath wholly black. Legs fuscous, the intermediate femora thickly and coarsely punctured.

Distinguished from the preceding species by its black head, the spot on the thorax, &c. Found at Valparaiso in Chili, one of the specimens at an elevation of 5000 feet above the sea.

4. (5.) *C. suturalis*, Bab.

Oblongo-ovatus, supra flavicans, subtus niger, vertice nigro, maculis 2 testaceis, elytris crebre nigro-irroratis striisque disci punctatis, antennis pedibusque flavis. (L. c. 5; lat. $2\frac{1}{2}$ lin.)

Head yellow, with the vertex black, inclosing two transverse yellow spots. Antennæ yellow. Structure of the thorax, as in the preceding species, yellow, with a very narrow black line on the hinder margin, and a slight cloud on the disk. Scutellum black. Elytra similar in form to those of its allies, but thickly covered with minute black spots (not reticulated), less closely placed near the lateral margins, which, together with a strongly marked line down the suture, are immaculate, the usual striæ nearly obsolete. Body beneath black, with a pale spot at the anterior angle of each segment of the abdomen. Legs fuscous yellow, the hinder pair rather darker.

The irrorated elytra of this insect will distinguish it from all the preceding.

Hab. Valparaiso.

b. Thorace postice vix latiori, lateribus subparallelis.

† Elytrorum basi thorace latiori.

5. (6.) *C. angusticollis*, Curt.

Oblongus, thorace elytrorum basi multo angustiori, lateribus parallelis rectis, pallidè flavus, diaphanus, vertice oculis pectorique nigris; elytris lineis longitudinalibus undulatis subinterruptis nigris notatis, striisque disci punctatis obsoletis, antennis pedibusque pallidè flavis. (L. c. 5; lat. $2\frac{1}{2}$ lin.)

C. angusticollis, Curt. in Linn. Trans. xviii. 195. t. xv. f. E.

The whole upper surface pale yellow and diaphanous, except the vertex, which is, together with the eyes, black. Thorax short, transverse, narrow, broadly emarginate in front, slightly produced over the head in the middle, the angles prominent and acute, sides parallel and depressed, the hinder angles rectangular, posterior margin sinuated, and produced somewhat over the scutellum; the centre of the disk depressed; the usual row of minute impressed dots near the anterior margin nearly obsolete. Scutellum small, its apex rounded, and a black spot in its centre. Elytra obovate-oblong, scarcely dilated, very long. The base much broader than the thorax; with four principal dark wavy lines upon each, not reaching to the base or apex, the second

and fourth from the suture longest and most strongly marked; between each of these is another irregular wavy line, and about three externally between them and the margin, the whole anastomosing more or less, so as to present a very irregular and imperfect system of reticulations; there is an abbreviated black line upon the truncate apex next to the suture; the lateral margins are broadly immaculate, and the usual striæ scarcely to be detected. Body beneath dark, the thorax and breast black, the abdomen fuscous. Legs pale yellow.

The singular thorax of this insect, distinguishes it from all the other species with which I am acquainted.

Since this paper was communicated to the Society, Mr. Curtis has published a description and figure of what appears to be the same insect as that now before us, in the Transactions of the Linnean Society. I have therefore adopted his name, and omitted that of *C. parallelus*, which I had conferred upon it.

Hab. Port St. Julians, S. A.

††. Elytrorum basi thoracem æquanti.

6. (7.) *C. rotundicollis*, Bab.

Oblongus, thorace elytrorum basin æquanti, lateribus rotundatis, fuscus, subtus niger; elytris crebre nigro-reticulatis striisque disci punctatis, antennis pedibusque fuscis. (L. c. 4; lat. 2 lin.)

Whole insect fuscous. Head nearly black on the crown, minutely punctured, with two deep foveæ between the antennæ. Thorax transverse, short, broadly emarginate in front, with the angles acute, the sides rounded, depressed, rugose, the hinder margin sinuated with a small longitudinal impression on each side, the hinder angles rounded; the anterior margin black, and several irregular dark clouds upon the disk. Scutellum dark fuscous, with its acute apex paler. Elytra oblong-ovate, so thickly covered with dark broad reticulations as to appear nearly black, the interior margins paler, the usual striæ rather strongly marked. Body beneath black. Legs fuscous.

Hab. Alpine situations in Tierra del Fuego.

B. Elytrorum apice non truncato, sed rotundato.

a. unguiculis anticis magnis.

7. (8.) *C. signatus*, Bab.

Obovatus, supra fusco-flavicans, subtus niger, vertice nigro, maculis 2 flavicantibus, thorace maculâ disci transversâ

nigrâ, elytris crebrissimè nigro-irroratis, striis disci punctatis, antennis pedibusque fusco-flavescentibus. (L. c. $4\frac{3}{4}$; lat. $2\frac{1}{2}$ lin.)

Ovate, fuscous yellow above. Crown of the head black, inclosing two transverse fuscous yellow spots. Antennæ fuscous yellow. Thorax transverse, short, broadly emarginate in front, the angles prominent and acute, margins oblique, slightly rounded, much broader behind, slightly sinuated, the angles acute, disk smooth, with a large transverse dark spot, attenuated at both ends. Scutellum fuscous. Elytra obovate, dilated beyond the middle, fuscous yellow, very thickly irrorated with black, leaving the exterior margin and a narrow line down the suture immaculate, the usual punctate striæ faint. Body beneath black. Legs fuscous yellow; the hinder pair rather darker; the anterior claws large, but yet rather smaller than in the preceding section.

Hab. Monte Video, and Tierra del Fuego.

Unfortunately the only specimens of this insect are females, and therefore it may be doubted whether it has the curious claws described above; it agrees, however, so nearly with our *C. notatus*, that I am inclined to refer them to the same group. In the following species the claws are much smaller, and although unequal in length, are yet similar in form, neither do they differ much in the two sexes. Still a slight approach to the unequal form may sometimes be detected in the males.

b. unguiculis anticis mediocribus.

8. (9.) *C. Darwinii*, Bab.

Ovatus, supra flavescens vel fusco-flavescens, subtus niger vel nigro-fuscus, vertice nigro, maculâ transversâ flavâ, thorace antice et postice maculâque disci nigris; elytris plus minusve crebre nigro-irroratis striisque disci punctatis, antennis flavis, pedibus flavis vel fuscescentibus. (L. c. 5-6, lat. $2\frac{1}{2}$-3 lin.)

Ovate, flavescent, fusco-flavescent, or fuscous. Crown of the head black, with a transverse flavescent spot, which is connected by its middle with the anterior concolorous part of the head, so as to form a T shaped mark. Antennæ yellow. Thorax of the same structure as the last, margined before and behind more or less broadly with black, and an ovate transverse spot of the same colour on the disk. Scutellum black. Elytra ovate, dilated slightly beyond the middle, flavescent or fuscous yellow, thickly irrorated with black, in some specimens so thickly as to make the

whole appear fuscous-black; the usual striæ rather strongly marked, and formed of irregular punctures. Body beneath black or fuscous-black. Legs dark yellow or fuscous.

Extremely variable in colour; some specimens being nearly black, and others quite pale.

Hab. Tierra del Fuego.

9. (10.) *C. calidus,* Fab.

Ovatus, capite thoraceque nigris, elytris crebre nigro-irroratis, maculâ magnâ triangulari dorsali prope basin nigrâ, lineâ interruptâ basali transversâ, marginibus externis elytrorum et lateribus thoracis rufis, striis disci punctatis, subtus niger, antennis pedibusque flavis, posticis fuscis. (L. c. 6; lat. 3 lin.)

C. calidus, Fab. Ent. Syst. 1, 193, 27; Syst. Eleut. 1, 265.

Oval; head black, smooth, with two minute foveæ between the eyes in front. Thorax of the same structure as in the preceding, black; the lateral margins broadly rufous. Scutellum black. Elytra slightly dilated beyond the middle, thickly irrorated with black; that colour becoming so much suffused upon the anterior part of the disk, as to form a large triangular black patch, nearly covering the whole width of the base, and extending half the length of the suture; the lateral margins, and a transverse patch at the base interrupted at the suture, rufous; there is a narrow yellow line upon each side of the suture, and three less distinct ones on the disk, terminated below by the black patch, and extending to the apex; the usual punctate striæ rather strongly marked. Body beneath black. The four anterior legs yellow, the posterior fuscous.

This beautiful insect approaches in its appearance to *Hydaticus,* but agrees with the present group in its structure. It may be distinguished by the curious dorsal patch, and the bright red transverse line at the base of the elytra. In one of our specimens this line is divided into four distinct spots. It is a native of Rio de Janeiro.

Colymbetes (Ilybius), *Steph. Ill.* (M) 5, 394.

Ilybius, *Erichs. Dytis.* 34.

10. (11.) *C. Saulcyii,* Dufour MSS. in Collect. Dom. Hope.

Ovatus, niger, lævis, depressus, maculis 2 frontalibus rufis, thoracis angulis anticis elytrisque lineâ apicali maculâ laterali

et puncto apicis castaneis, subtus niger, antennis pedibusque fuscis. (L. c. $3\frac{1}{2}$; lat. 2 lin.)

Ovate, black, shining, smooth, depressed. Head with two transverse red spots on the crown. Antennæ fuscous. Thorax transverse, very short, broadly emarginate in front; the angles prominent and acute; hinder margin nearly straight, the angles slightly prominent and acute; the anterior angles broadly castaneous. Scutellum black. Elytra ovate, black; a little beyond the middle, near the outer margin, there is a triangular castaneous spot, and within the apex another small round one, connected with the former by a slender castaneous line, which is continued beyond the apical spot, but interrupted by the suture; the usual punctate lines on the disk but faintly marked. Under side black, with a small red spot on each side of the segments of the abdomen. Legs fuscous, the hinder ones darker.

Hab. Callao.

The appearance of this insect is very similar to *C. vitreus*, but it differs in shape, colour, and in the marks at the end of the elytra. It has the structure of Erichson's genus *Ilybius* (as indeed has *C. Grapii* referred by Mr. Stephens to *Agabus*), namely, the unequal posterior claws by which it is at once separated from *C. vitreus*. I cannot let this opportunity pass without remarking the utter uselessness of these generic divisions, since, as sections, they separate insects so closely allied as *C. vitreus* and *Saulcyii*.

11. (12.) *C. punctum*, Bab.

Ovatus, niger, lævis, depressus, thoracis angulis anticis, ore, antennis lunulis 2 frontalibus pedibusque anticis rufescentibus, elytris maculâ parvâ laterali oblongâ fenestratâ, subtus niger, pedibus posticis fuscis. (L. c. 4; lat. $2\frac{1}{2}$ lin.)

Ovate black, very minutely reticulate-strigose. Head with two transverse usually confluent lunules on the crown, and the mouth and antennæ rufescent. Structure of the thorax as in the last, the anterior angles rufescent, and the posterior not prominent, and slightly rounded. Scutellum black. Elytra ovate, black; a little beyond the middle, near the outer margin, is a minute oblong fenestrated spot; the usual striæ are formed of numerous punctures, and are strongly marked. Body beneath black. Legs rufescent, the posterior pair fuscous.

Hab. Valparaiso.

12. (13.) *C. magellanicus*, Bab.

Ovatus, niger, subdepressus, elytris subcostatis maculâ parvâ

laterali oblongâ fenestratâ, subtus niger, antennis pedibusque fuscis. (L. c. 3; lat. $1\frac{1}{2}$ lin.)

A third part smaller than the preceding, ovate, black, very minutely reticulate-strigose. Head immaculate. Antennæ fuscous. Thorax much broader behind than in front, the hinder angles slightly acute. Scutellum black. Elytra oval, obscurely ribbed longitudinally, and having at a little beyond the middle, and near to the outer margin, a minute oblong fenestrated spot; the usual striæ scarcely distinguishable, and very irregular. Body beneath black. Legs fuscous.

Hab. Tierra del Fuego.

COLYMBETES (COPELATUS.)

COPELATUS, *Erichs. Dytis.* 38.

13. (14.) *C. elegans*, Bab.

Ovato-oblongus, rufo-fuscus, impunctatus, thorace longitudinaliter strigoso, elytris striis 10 ornatis, alternis abbreviatis, apicem acutum non attingentibus, corpore subtus antennis pedibusque rufo-fuscis. (L. c. 3; lat. $1\frac{1}{2}$ lin.)

Ovate-oblong, fuscous red, not punctured. Head short, transverse, with two minute foveæ between the eyes. Thorax short, transverse, broadly emarginate in front; the angles acute and prominent; margins slightly rounded, broader behind; the margin nearly straight; the angles rectangular; the disk darker than the sides and head, covered with minute longitudinal striæ, a row of which occupy the place of the usual series of punctures near to the anterior margin. Scutellum minute. Elytra oblong, acute, rufo-fuscous, the base paler, each with ten strong longitudinal striæ, which do not extend to the apex, the second about half as long, and the other alternate ones not exceeding three-fourths of the length of the elytra. Body beneath and legs fuscous red.

Hab. Rio de Janeiro.

HYDATICUS, *Leach.*

1. (15.) *H. Havaniensis*, Laporte.

Obovatus, testaceus, thorace antice posticeque nigro, elytris nigro-irroratis maculâ dorsaliâ transversâ nigrâ lateribus testaceis, subtus niger, antennis pedibusque 4 anticis testaceis, femoribus posticis testaceis maculâ internâ basali nigrâ; tibiis nigro-fuscis, tarsis fuscis. (L. c. 5-$5\frac{1}{2}$; lat. $2\frac{3}{4}$-$3\frac{1}{4}$ lin.)

H. Havaniensis, Laporte, Etud. Ent. 96.

Obovate, testaceous above, impunctate. Crown of the head inclosing, by a wavy line, a bilobed testaceous spot. Antennæ testaceous. Thorax transverse, short, the anterior angles prominent, acute, testaceous; on the anterior margin a uniformly broad black fascia, and on the posterior another, which is broader, emarginate in the middle, and narrowing off into a slender line as it approaches the testaceous lateral margins. Scutellum black. Elytra ovate, thickly covered with rather large black dots, which become confluent at about the middle, and form a broad irregular transverse fascia, which is succeeded by a pale spot, variegated with black clouds and dots, and extending to the apex; on the disk are three rows of deep punctures. In the female the thorax and elytra are minutely strigose punctate. Body beneath black, several segments of the abdomen having a pale spot on each side. The four anterior legs testaceous, the posterior variegated, the femora testaceous, with a large black patch on the inner side, extending from the base to three-fourths of their length; tibiæ black or dark fuscous, tarsi fuscous.

This beautiful insect is a native of Rio de Janeiro, and Laporte has described it from specimens obtained in the island of Cuba.

Hyphidrus, *Ill. Steph.*

1. (16.) *H. maculatus*, Bab.

Ovatus, brevis, gibbus, fuscus, capite, thoracis lateribus elytrorumque maculis testaceis, subtus fuscus, antennis testaceis, pedibus fuscis. (L. c. 2; lat. $1\frac{1}{4}$ lin.)

Short, ovate, gibbous, the whole upper surface coarsely punctate. Head testaceous; in one specimen fuscous. Antennæ testaceous. Thorax transverse, similar to *H. ovatus*, fuscous. Elytra ovate, much dilated near the middle, the apex rounded, fuscous, except a bilobed spot at the base; the humeral angle, the anterior half of the lateral margin, a longitudinal abbreviated line near the centre of the suture, one on the middle of the disk connected with a triangular transverse spot on the margin, and two small triangular spots connected with this last, and with each other within the apex, which are testaceous. Body beneath fuscous, coarsely punctured, very gibbous. Legs fuscous.

This pretty little insect was obtained at St. Jago.

Erichson and Brullé concur in describing the posterior tarsi of this genus as possessed of two claws, which are said to be unequal, the upper one fixed, and the lower shorter and moveable.

After a careful examination of several species, I must agree with Stephens in considering that there is only one claw, and that moveable, the apparent upper claw being only a long seta.

HYDROPORUS, *Clairv.*

A. Thoracis lateribus rotundatis, elytrorum apice dentato.

1. (17.) *H. Darwinii*, Bab.

Oblongo-ovatus, subdepressus, punctatus, ferrugineus, vertice nigro, thorace maculis 2 fuscis lineisque 2 abbreviatis impressis, elytris nigris margine externo maculis 2 lateralibus lineisque interruptis flavis, corpore subtus pedibusque ferrugineis. (L. c. 2; lat. 1 lin.)

Oblong-ovate, depressed, thickly punctured throughout. Head rounded, pale testaceous, narrowly black behind. Antennæ testaceous, with the terminal joints ringed with black. Thorax pale testaceous, short, transverse, broadly and deeply emarginate in front, the angles acute, the sides straight and parallel, except near to the anterior angles, where they are strongly rounded, posterior margin nearly straight, produced in the middle, narrowly margined with fuscous, and two small spots of that colour connected with it towards its middle; also an abbreviated longitudinal impressed line on each side. Elytra broader than the thorax, ovate, the apex acute, with a minute tooth upon each side, black; the anterior margin, two angular marginal spots, a line interrupted in the middle next the suture, and about four very slender and much interrupted lines upon each, testaceous. Body beneath testaceous, the abdomen rather darker. Legs testaceous, the posterior pair darker.

Hab. King George's Sound, Australia.

2. (18.) *H. undecimlineatus*, Bab.

Oblongo-ovatus, subdepressus, punctatus, flavus, elytris suturâ lineis 5 maculisque 2 lateralibus nigris, corpore subtus antennis pedibusque flavis. (L. c. 2; lat. 1 lin.)

Oblong-ovate, depressed, thickly punctured throughout. Head and thorax as in the last, except that the latter has two faint dark clouds upon its hinder margin alone, and the sides are uniformly rounded. Elytra broader than the thorax, ovate, the apex acute, with a minute tooth upon each side, yellow; with the suture, five regular lines upon each, two oblong spots between the first and second, and two spots (one angular, and at about the middle, the

other oblong, and near the apex,) between the fifth and the lateral margin, black; the space next to the suture and the second and fourth interstices the most regular, and of a brighter colour. Body beneath and legs yellow.

Hab. Tierra del Fuego.

B. Thoracis elytrorumque lateribus continuis, elytrorum apice non truncato.

3. (19.) *H. obscurus*, Bab.

Oblongo-ovatus, opacus, minutissimè punctatus, supra et subtus fuscus, thorace, antennis pedibusque flavis. (L. c. $\frac{3}{4}$; lat. $\frac{3}{8}$ lin.)

Minute, oblong-ovate, opaque, fuscous both above and below. Head large. Antennæ yellow. Thorax yellow, transverse, short, broadly emarginate in front, sides rounded, posterior margins wavy, the disk slightly elevated transversely, and a deep abbreviated impressed line on each side behind. Elytra ovate, fuscous, the base and suture darkest, the margins and apex reddish, very minutely punctured, and slightly downy, an impressed line on each side at the base in continuity with that on the thorax. Body beneath slightly downy, fuscous, with the abdomen rather paler. Legs yellow.

Hab. Rio de Janeiro.

4. (20.) *H. nitidus*, Bab.

Oblongo-ovatus, nitidus, grosse punctatus, supra et subtus fuscus; capite, thorace (medio excepto), antennis, pedibusque flavis. (L. c. $\frac{3}{4}$; lat. $\frac{3}{8}$ lin.)

Minute, oblong-ovate, shining, coarsely punctured, fuscous both above and below. Head and thorax similar to the last, yellow, the latter with a fuscous spot in the centre, and the lateral impressed lines sinuated, and nearly reaching to the anterior margin. Elytra ovate, fuscous, coarsely punctured, with a paler patch upon each, caused by their transparency, and an impressed line upon each side at the base in continuity with that on the thorax. Body beneath fuscous. Legs and antennæ yellow.

Hab. Rio de Janeiro.

Hydroporomorpha, *Bab.**

Corpus elongatum, depressum. *Caput* oculis non prominulis, fronte lævi. *Antennæ* 11-articulatæ, infra oculos insertæ, articulo primo elongato, 2do quam tertium paulo longiore,

* Derivatio nominis, *Hydroporus* and μορφη, *forma*.

reliquis inter se æqualibus tertio brevioribus obconicis, ultimo fusiformi acuminato. *Labrum* paulo emarginatum. *Palpi maxillares externi* articulis 1, 2 et 3 obconicis, subæqualibus, tertio paulo longiori; 4to maximo, elongato, fusiformi, truncato; *p. m. interni* 2-articulati, articulis elongatis attenuatis, 1mo subclavato, 2do cylindrico. *Mentum* lobo intermedio dentiformi obtuso. *Palpi labiales* articulis 1mo et 2do transversis, 3tio quam præcedentes longiori, obconico; 4to elongato, ventricoso, truncato. *Scutellum* breve, latum, triangulare. *Pedes* 4 anteriores tarsis 4-articulatis,* postici tarsis 5-articulatis unguiculisque 2 æqualibus mobilibus.

[Pl. I. fig. 3 *a*, labrum; 3 *b*, mandible; 3 *c*, maxilla; 3 *d*, labium; 3 *e*, fore leg; 3 *f*, middle leg.]

Differs from *Hydroporus* by the structure of the internal maxillary and labial palpi, and by the presence of a scutellum.

1. (21.) *H. parallela*, Bab. (Pl. 1, fig. 3.)

Oblonga, antice obtusa, postice acuminata, lateribus parallelis, supra rufa, thorace antice et postice elytrisque (apice marginibusque exceptis) fuscis; corpore subtus, antennis, pedibusque fusco-rufis. (L. c. 2; lat. $\frac{3}{4}$ lin.)

Head short, transverse, rounded in front, with two longitudinal slightly impressed foveæ between the eyes. Thorax transverse, short, broadly emarginate in front; the angles acute; lateral margins rounded; posterior margin straight, very slightly produced in the middle over the scutellum; disk smooth, with a transverse row of punctures in front, and a similar one behind, the latter broadly interrupted in the middle; rufous, with the anterior and posterior margins fuscous. Scutellum small, triangular, transverse, fuscous. Elytra of the same width as the thorax, oblong, the sides parallel for three-fourths of their length, then strongly rounded to the apex, which is acute and prominent; disk coarsely punctured, with one central row of more regular punctures upon each; fuscous, with the exception of the apex and external margins, which are rufous. Body beneath, legs and antennæ, dull rufous.

Hab. Rio de Janeiro.

Anodocheilus, *Bab.*†

Corpus ovatum, depressum. *Caput* fronte antice carinâ trans-

* [It appears to me that the tarsi of this genus are 5-jointed, a minute nodose joint being placed at the base of the long terminal joint.—J. O. W.]

† Derivatio nominis, *α non*, *ὀδων dens*, *χειλος margo*.

versali semicirculari terminatâ, oculis parum prominulis. *Antennæ* breves, 11-articulatæ, infra oculos insertæ; articulis 2 primis crassioribus, elongatis; 3tio elongato, attenuato, obconico; 4to brevi, transverso; 5to—10mo crassiusculis, moniliformibus, terminali longissimo, acuminato. *Palpi maxillares externi* articulis 2 primis brevibus transversis; 3tio longiori, obconico, ultimo maximo, elongato, fusiformi, oblique truncato; *p. m interni* 2-articulati, articulis elongatis attenuatis, 1mo cylindrico, 2do subulato. *Mentum* lobo intermedio nullo, lobis lateralibus rotundatis. *Palpi labiales* articulis 1, 2 et 3 brevibus transversis, 4to maximo, ventricoso, oblique truncato vel emarginato. *Scutellum* inconspicuum. *Tarsi* omnes 5-articulati, unguiculis 2 æqualibus.

[Pl. I. fig. 4 *a*, mandible; 4 *b*, maxilla; 4 *c*, labium.]

Differs from *Hydroporus* by the structure of its maxillary and labial palpi, and by the want of a tooth in the centre of its mentum.

1. (22.) *A. maculatus*, Bab. (Pl. 1, fig. 4.)

Late ovatus, flavus, elytris fuscis, maculis 2 transversis apiceque flavis, grosse punctato-striatis, costatis; subtus fuscus, grosse punctatus, antennis pedibusque flavis. (L. c. $\frac{3}{4}$; lat. $\frac{3}{8}$ lin.)

Broadly ovate, yellow, flat above. Head smooth, broad, rounded in front. Thorax smooth, broadly emarginate in front; the angles acute; sides rounded, particularly towards the front, sinuated behind with a transverse impression; disk transversely elevated, and a large tubercular elevation on each side behind. Scutellum wanting. Elytra broad, flat, with numerous lines of very coarse punctures; the suture slightly elevated, and an elevated costa on the disk, in continuity with the tubercle on the thorax; fuscous, with the external margin, two transverse patches, and the apex, yellow. Body beneath fuscous, very coarsely punctured, gibbous. Legs and antennæ yellow.

Hab. Rio de Janeiro.

Desmopachria, Bab.*

Corpus subglobosum. *Caput* fronte antice carinâ semicirculari terminatâ, oculis parum prominulis. *Antennæ* breves, 11-articulatæ, infra oculos insertæ, articulis 3 basalibus elongatis, 1mo obconico, 2do elliptico crassissimo, 3tio attenuato clavato, 4to minimo transverso, 5to paululum quarto majori

* Derivatio nominis, δεσμος *catena*, παχυς *crassus*, ακρον *apex*.

transverso, 6to—10mo transversis quinto majoribus, ultimo subulato 2 præcedentium longitudinem subæquante. *Palpi maxillares externi* articulis 1, 2 et 3 breviusculis, transversis, obconicis; 4to maximo, elongato, ventricoso, apice attenuato; *p. m. interni* subulati attenuati, articulo primo elongato subcylindrico, 2do dimidio breviori. *Mentum* lobo intermedio dentiformi minuto acuto, lobis lateralibus subacutis. *Palpi labiales* articulis 1, 2 et 3, brevibus transversis, 4to maximo ovato obtuso. *Scutellum* inconspicuum. *Pedes* abbreviati, tarsis posticis 4-articulatis.

[Pl. 1, fig *a*, mandible; 5 *b*, maxilla; 5 *c*, labium; 5 *d*, antenna; 5 *e*, fore leg; 5 *f*, hind leg.]

Closely allied in appearance to *Hygrotus*, Steph., but distinguished by the structure of its antennæ and palpi.

1. (23.) *D. nitida*, Bab. (Pl. 1, fig. 5.)

Rotundato-ovata, fusco-flava, elytris obscurioribus, antennis pedibusque flavis. (L. c. $\frac{3}{4}$; lat. $\frac{1}{2}$ lin.)

Between orbicular and ovate, dusky yellow, convex above, smooth and shining. Head smooth. Thorax transverse, short, broadly emarginate in front; sides rounded, hinder margin sinuated, disk punctured. Scutellum wanting. Elytra cordate, pointed, rather deeply punctured. Body beneath dusky yellow, the breast darker. Legs and antennæ yellow.

Hab. Rio de Janeiro.

II. *Observations upon the Hemipterous Insects composing the Genus* Syrtis *of Fabricius, or the Family* Phymatites *of Laporte, with a Monograph of the Genus* Macrocephalus. *By* J. O. Westwood.

[Read October 2, 1837.]

The very singular structure of the insects composing this little group, combined with the very great rarity of the species of which the genus *Macrocephalus* is composed, will, I am sure, be deemed considerations of sufficient interest for bespeaking the attention of the Entomological Society to a few observations upon the group itself, and to a description of the species composing the genus in question; of which I have hitherto seen no specimens except in the Collections of the Royal Museums of Berlin and Paris, and those in my own cabinet, all of the latter having evidently, from their labels, been obtained from Mr. Abbot of Georgia, of which country they are natives.

The earliest notices of this group are to be found in the works of Linnæus, Geoffroy, Sulzer, De Geer, and Schellenberg, wherein two of the species were described as species of the genus *Cimex*, and rudely figured. Swederus however first proposed the generic separation of some of these insects having a very large scutellum from the great genus *Cimex*, under the name of *Macrocephalus*, in the Swedish Transactions for 1787; having for its type the *M. cimicoides*, an inhabitant of the southern states of North America, and which, together with other insects observed in the cabinets of Drury and other English Entomologists during a visit to England, he described on his return to Sweden in 1787. In 1802, Latreille proposed another genus, *Phymata*, in the third volume of his *Histoire Naturelle*, &c., the type being the European species previously described by Fabricius as an *Acanthia* (*A. crassipes*).

In the following year, 1803, Fabricius, unacquainted with the establishment of the genera *Macrocephalus* and *Phymata*, described the genus *Syrtis* in his *Systema Rhyngotorum*, into which he introduced the species of both genera, *Macrocephalus* and *Phymata*. It is essential, however, to observe the precise manner in which he treated the species of this new genus, as it affords another instance of the necessity for the adoption of the principle which I have elsewhere endeavoured to illustrate, namely, that it is essential in subdividing any old and extensive genus to retain the old generic name for that particular species which can be clearly shown to have been the insect which the author of the old genus

had most particularly in view when he proposed such genus, and which he consequently regarded as its express type.

The first species of the genus *Syrtis* was the European *Acanthia crassipes*, which we have already seen Latreille had expressly given as the type of his genus *Phymata*. If therefore there existed no other means of identifying the Fabrician type of the genus *Syrtis*, I maintain that we ought to regard *Syrtis* as synonymous with *Phymata*, although it may (as indeed in this case it does) happen, that the genus *Syrtis* contained species not generically identical with the first species.

But in this case there is no such uncertainty. The second Fabrician species of *Syrtis* was the American *Cimex erosus* of Linnæus, and from this insect the characters of the mouth were expressly drawn by Fabricius: supposing therefore, for a moment, that every other species placed by Fabricius in the genus *Syrtis*, were now ascertained to be generically distinct from this species dissected by Fabricius, it must be quite clear that the *erosus* was the true type of *Syrtis*, and the only species which ought to remain therein; and my opinion upon the matter is, that in case such typical species had *previously* received from some other author a distinct generic appellation, it would not only tend to confusion, but would be decidedly improper to apply the name *Syrtis* to any other insect placed by Fabricius in that genus, which did not possess the character of such type. Of the impropriety of such a step this very genus affords an instance; for the last three Fabrician species do not correspond with the type, indeed Fabricius himself says, "Ultimæ tres species ab hoc genere differe videntur—forte proprii generis;" and yet by adopting the principle advocated by some authors (viz., that it is proper to employ a second synonymical generic name for species not according with the type of the second genus, although placed therein), it would be as correct to retain the generic name *Syrtis* for these three discrepant species, as to appropriate such generic name to any other species not agreeing with the type.

It is true that these three species belong to the genus *Macrocephalus* first above-mentioned, but by not attending to the other species of the Fabrician *Syrtis*, there has been additional confusion introduced even into this little group.

From what has been said it will be seen that the three generic names thus far introduced into the group are—

1. Macrocephalus *Swederus;* (true type, *M. cimicoides.*)
2. Phymata *Latreille;* (true type, *Acanthia crassipes.*)
3. Syrtis *Fabricius;* (true type, *Cimex erosus*, Linn.)

In the *Genera Crustaceorum*, &c., Latreille however united the two last named groups into one genus, *Phymata*, divided into two sections from the supposed variation in the structure of the antennæ; the first section having *Ph. crassipes* and the second *Cimex erosus* for the type.

Laporte, however, in his Revision of the *Hemiptera*, published in Guérin's *Magazin de Zoologie*, has again introduced three genera into the group, namely,—1. *Phymata*, having *crassipes* as its type; 2. *Discomerus*, Laporte, having *erosus* as its type, with the Latreillian character obtained from the antennæ alone, and the observation "le génre a tous les autres caractères des *Phymates*;" and 3. *Macrocephalus*, with *M. cimicoides* (or the *manicata*, Fabr.)

From the review of the genera given above, it will however be at once perceived that if the *Cimex erosus* be generically distinct from the *Phymata crassipes*, the generic name of *Syrtis* must be given to it, and that it is improper to apply a new generic name to it.

The synonymy of these groups would then stand thus:—

1. *Macrocephalus*, Sw. 1787. } *Syrtis*, pars aberrans, Fab. 1803. { Typ. *M. cimicoides*, Sw. (*Syrtis manicata*, Fab.)

2. *Phymata*, Latreille, 1802. { *Phymata*, sect. 1, Latreille, 1807. / *Syrtis*, pars aberrans, Fab. 1803. / *Phymata*, Laporte .. .... 1833. } Typ. *Syrtis crassipes*, Fab.

3. *Syrtis*, Fab. pars typica, 1803. { *Phymata*, sect. 2, Latreille, 1807. / *Discomerus*, Laporte.... .1833. } Typ. *Cimex erosus*, Linn.

These observations (made with the view of again pointing out the disadvantages arising to science from the still too prevalent inattention to generic types), presuppose the generic distinction of these three groups; but a careful revision of the insects themselves prove most decidedly that Latreille had established his two sections of *Phymata* upon sexual characters alone, and that Laporte, in adopting Latreille's sectional character as that of his new genus *Discomerus*, proposed a group which cannot be maintained. In this view therefore the synonymy of the groups will run thus:

1. *Macrocephalus*, Swederus, ut supra.
2. *Phymata*, Latreille, 1802, (e *Syrtide* haud genericè distincta).

Syn. *Syrtis*, Fabricius, pars typica et (partim) aberrans, 1803.

Phymata, sect. 1 et 2, Latreille, 1807.

Phymata et *Discomerus*, Laporte, 1833.

Respecting the structural characters of these insects, the most remarkable, and which exists throughout, and in fact distinguishes

the group, is the singular form of the fore legs, which are raptorial, the femora being very large and nearly oval, or more properly compresso-subtrigonate, having the anterior and lower part much compressed, regularly curved, and armed with very minute and numerous teeth forming a saw. Latreille describes this part as channelled for the reception of the curved tibia, but this is not the case. The tibiæ which have a curve equivalent to the curve of the femoral margin are very acute at the tips, and furnished within with a series of minute teeth similar to those of the femora. They are about half the length of the femora, extending to a strong hook on the under margin of the latter. There is no trace of a tarsus to be observed in the fore legs. Latreille, however, says the tarsi are minute and bent back upon the tibia, but such is certainly not the case. The four hind legs are of the ordinary form, the tarsi being apparently only two-jointed, the basal joint being exceedingly small. Latreille describes them as 3-jointed, but Leon Dufour says they have only two joints. With a high-powered lens the posterior tarsus in *M. cimicoides* exhibited the appearance represented in Pl. 2, fig. 4 *c*.

The basal joint or trochanter, as in all raptorial legs, is greatly enlarged, so as to give additional motion to the leg.

Of the natural affinities of these insects, Leon Dufour has observed that their internal organization fully confirms the place assigned to them by Latrielle between *Mirus* and *Aradus*. Their general external structure is however much more analogous to the latter than to the former group.

The genus Phymata is distinguished by the more elongated antennæ, which are bent back during repose and rest within a lateral groove of the thorax; the scutellum is of small size, and the membrane of the hemelytra is considerably reticulated.

In the real type of this genus (*P. crassipes*), the antennæ of the male (fig. 2 *a*) are terminated by a cylindrical joint, thicker than the three preceding and rather longer than the three conjointly; the female antennæ, on the contrary (fig. 2 *c*), are terminated by a more clavate joint, scarcely so long as the two preceding joints. The peculiar character of the neuration of the hemelytra will be seen in fig. 2 *e*, and of the extremity of the male abdomen in fig. 2 *b*, and of that of the female in fig. 2 *d*.

In *Phymata crosa* (*Discomerus crosus*, Laporte), the male antennæ (fig. 3 *a*) are terminated by a slightly clavate joint, at least as long as the preceding joints conjointly, whilst the last joint of the female antennæ is about the length of the two preceding joints

(a minute apparent joint at the base of the third joint not being computed) (fig. 3 *e*). The neuration of the hemelytra (fig. 3 *e*), and the male (fig. 3 *b*) and female abdomen (fig, 3 *d*), are almost identical with those of *Phymata crassipes*.

Thus it will be seen that Latreille characterized his first section from a male specimen of *Phymata crassipes*, and his second section from a female of *Phymata crosa*.

The following is a description of a new and remarkable species in this genus which differs in several respects from its generic characters.

Phymata integra (n. s.) (Pl. 2, fig. 1.)

Pallidè albido-lutea, thorace elongato, antice attenuato, lateribus subrectis, capite haud bifido.

Long. corp. lin. $5\frac{1}{2}$.

Habitat —— ? In Mus. Britannic.

Totum corpus pallidè albido-luteum, abdominis marginibus fusco-maculatis; hemelytrorum corium concolor, membrana apicalis subhyalina, nubilâ fuscâ versus basin, venis pallidis. Pedes antici concolores, femora postica fasciâ centrali apiceque fuscis, tibiis tarsisque fuscis, illis fasciâ mediâ luteâ. Abdomen lateribus rotundatis, nec angulatis. Thorax elongatus, antice attenuatus, in medio transversè sulcatus, portione posticâ carinis duabus divergentibus, lateribus fere rectis; angulis posticis lateralibus margineque postico utrinque versus basin scutelli tuberculatis. Caput crassissimum, antice haud bifidum; antennæ mutilatæ, articulo 1mo brevissimo, 2do brevi.

Obs.—E *Phymatis* reliquis differt thorace elongato lateribus fere recto, abdomine rotundato capiteque integro. (Pl. 2, fig. 1 *a*.)

The genus Macrocephalus is distinguished by having the antennæ short and thick (fig. 4 *a*), alike in both sexes, inserted at the front of the head, generally porrected and not reposing in a lateral groove of the thorax, the head being in fact too long and cylindrical to admit of it; the scutellum is very large, covering the entire hemelytra and wings, and extending to the extremity of the body as in the genus *Scutellera*, &c., leaving however the sides of the abdomen exposed: the hemelytra being thus protected have the leathery part greatly reduced in size, and the membranous part enlarged; the veins are also very few in number (fig. 4 *c*). The rostrum is about as long as the head (fig. 4 *a*, *b*). The fore leg is represented in fig. 4 *d*, the hind tarsi in 4 *e*, the extremity of the male abdomen in 4 *f*, and of the female in 4 *g*.

The species of this genus are exclusively confined to the warmer regions of America, being found from Carolina to Brazil; they are of small size, never attaining to the length of half an inch. Their colours are generally variegated with buff, luteous, reddish, brown, or black; the upper surface of the body is generally more or less rugose, and clothed with minute rigid scales. Nothing is recorded of their habits: their motions in all probability, judging from the structure of their legs, are slow and awkward.

Sp. 1. *Macrocephalus cimicoides*, Swederus. (Pl. 2, fig. 5 and 5 *a*.)

"Griseo-ferrugineus, scutello cinerascente maculâ coleoptratâ flavâ, alis purpurascenti-violaceis, tibiis anticis incrassatis.

"Habitat in Georgia Americæ. Mus. D. Drury.

"Descr.—Corpus *Cim. croso* L. paulo minus, griseo-ferrugineum.

"Caput longitudine fere thoracis, antice emarginatum, subtus canaliculatum, pro rostro lateribus inferioribus serrato-crenatis. Antennæ longitudine capitis, griseo-ferrugineæ. Rostrum brunneum, subglabrum, apice subpilosum. Setæ flavescentes. Thorax antice angustatus, emarginatus, angulis subacutis, postice subrotundatus, lateribus spinosus, spinâ utrinque obtusâ truncatâ vix bifidâ. Lineæ 2 dorsales elevatæ, obsoletiores, sordidè flavescentes. Scutellum apice rotundatum cinerascens, atomis fuscis adspersum, basi nigro-ustulatum, macula oblonga postice subtriloba elevato-coleoptrata, flavissima notatum. Abdomen scutello latius subrhombeum integrum, subtus saturatius ferrugineum. Alæ purpurascente-violaceæ, margine exteriori, ut in *Cimicibus*, usque ad medium subcoriaceo, griseo-cinereo. Pedes grisei. Tibiæ anticæ valde incrassatæ, subtus dente subacuto, apice ungulo longiori arcuato subulato armatæ." Swederus, Act. Holm. 1787, p. 185, pl. 8, fig. 1, with details from which figures 5 and 5 *a* are copied.

Obs. 1.—*Syrtis manicata* Fabr. (Syst. Rhyng. p. 123, No. 7) a Latreillio (Gen. Crust. vol. 3, p. 138) eadem cum præcedente habetur. In descriptione Fabriciana insectum coloris grisei ("*S.*—— grisea, scutello lineâ dorsali baseos albâ."—"Thorax griseus."—"Scutellum griseum") describitur, cum patria Carolina.

Obs. 2.—*Syrtis manicata*, Wolff, (Icon. Cimicum, t. 17, f. 163. Encycl. Méth. Ins. pl. 374, fig. 7), certe species distincta; forsan *M. affinis*, Guér.

Obs. 3.—In musæo regio Berolinensi insectum hujus generis sub nomine *M. manicatæ* asservatur, coloris fuscescenti-ferruginei, thoracis parte posticâ magis griseâ lineis duabus elevatis divergentibus, pallidioribus; antennis pedibusque pallidè fulvescentibus; scutello vero ut in *M. cimicoide*, Swed. Long. corp. $4\frac{1}{2}$ lin. An eadem?

Obs. 4.—Insectum denique possideo coloris griseo-ferruginei, cum parte elevatâ thoracis squamis griseis pallidioribus obsitâ, antennis nigris, articulo ultimo fusco; corpore subtus pedibusque griseo-ferrugineis, scutello basi parum obscuriori, colore ferrugineo magis intenso, maculâ pallidâ basali ut in *M. cimicoide*, Swed.; thorace lineis duabus divergentibus paullo elevatis, at vix pallidioribus. Long. corp. lin. 4. Habitat in Georgia Americæ. An varietas *M. cimicoides?* vix species distincta.

Sp. 2. *Macrocephalus notatus.* (n. s.)

M. pallidè fuscus, punctatissimus; capite cum antennis obscurè fuscis, thoracis parte anticâ rufescenti; capitis lateribus subrufis, pedibus lutescentibus; scutello maculâ magnâ subrhombicâ, dimidium basale scutelli occupante, albidâ, punctisque duobus oblongis subapicalibus nigris.

Long. corp. lin. $3\frac{3}{4}$.

Habitat in Colombia. D. Lebas. In Mus. Reg. Parisiis.

Variat macula ad basin scutelli angustiori. Habitat "Ouest Capitanerie des Mines."

Obs.—*M. cimicoidi* valdè affinis.

Sp. 3. *Macrocephalus tuberosus.* Klug. (n. s.)

M. fuscus, thorace scutelloque subgranulatis, capite et thoracis parte anticâ pallidè ochraceis; antennis pedibusque albido-luteis; scutello maculâ ovato-hastatâ e basi ultra medium scutelli extensâ, haud elevatâ, lineisque duabus basalibus obscuris notato.

Long. corp. lin. $4\frac{1}{2}$.

Habitat Cassapava Brasiliâ. D. Sello. Mus. Reg. Berol. *Macrocephalus tuberosus*, Klug, MSS.

Sp. 4. *Macrocephalus obscurus.* (n. s.)

M. pallidè griseo-lutescens, capite cum antennis, corpore subtus cum pedibus et thoracis parte anticâ luteo-fulvescentibus, hujus parte posticâ obscuriori, et, quam in *M. cimicoide*, paullo

longiori; angulis lateralibus magis truncatis subbifidis, lineisque duabus paullo elevatis divergentibus; scutello ad basin obscuriori, maculâ oblongo-obovatâ ad dimidium scutelli extensâ, lineâque elevatâ tenuissimâ ad apicem currente.

Long. corp. lin. $3\frac{1}{2}$.

Habitat in America Meridionali. D. D'Orbigny (No. 167).

In Mus. Reg. Parisiis, et nostr.

Obs.—*M. tuberoso*, Klug, affinis at minor.

Sp. 5. *Macrocephalus pulchellus*, Klug. (n. s.)

M. ochraceus, capitis disco thoraceque fuscis, hujus margine tenui maculisque duabus ovalibus disci obliquè positis pallidis; parte posticâ vix elevatâ; antennis pedibusque ochraceis, illarum apicibus paullo obscurioribus, scutello nigro albido-maculato et fasciato.

Long. corp. lin. $2\frac{1}{4}$.

Habitat in Insulâ Cubâ. D. Muller. In Mus. Reg. Berol.

Macrocephalus pulchellus, Klug, MSS.

Scutellum nigrum; angulis humeralibus, puncto triangulari basali, lunulâ parvâ ante medium, fasciâ latâ mediâ, antice emarginatâ, apiceque ipso scutelli albidis.

Sp. 6. *Macrocephalus leucographus*, Klug. (n. s.)

M. corpore obscurè lutescenti, capite supra nigro, antennis fuscis, thorace et scutello maculis albidis variis; abdominis lateribus detectis fulvis, annulis nigris.

Long. corp. lin. $3\frac{1}{4}$.

Habitat in Insulâ Heyti, Port au Prince. In Mus. Reg. Berol.

M. leucographus, Klug, MSS.

Thorax niger, margine tenuissimo (in medio interne paullo producto) maculisque duabus parvis obliquis albidis, disco parum rufescenti. Scutellum nigrum, maculâ oblongâ basali postice obliquè bifidâ, alterisque tribus ovalibus posticis (scil. 2, 1) albis. Pedes pallidè albidi, femoribus anticis nigris, geniculis pallidis.

Var. α. Thorace toto nigro; maculis scutellaribus ut supra descriptis.

Var. β. Nigricans, squamis perpaucis, fascias duas in medio scutelli interruptas formantibus, pedibus nigris, tarsis obscurè albis.

Var. γ. Fortè immatura. Luteo-fulva, scutello ut in typo, at multo obscurius, maculato.

Sp. 7. *Macrocephalus crassimanus*, Fabricius.

M. pallidè luteo-flavescens, squamis luteis obsitus; capite, antennis, et parte posticâ thoracis (vix elevatâ) ferrugineis; thorace postice utrinque subspinoso, scutello concolori, subplano, carinâ centrali deficienti; pedibus 4 posticis obscurè ferrugineis, hemelytrorum corio ferrugineo, membrana hyalina.

Long. corp. lin. $4\frac{1}{2}$.

Habitat in America Meridionali, " St. Jean." In Mus. Reg. Berol.

Fabricius, Syst. Rhyng. p. 123, No. 9. (*Syrtis crassimana.*)

Sp. 8. *Macrocephalus affinis*, Guérin.

M. fuscus, aureo-sericeus, thorace postice elevato, rugoso, in medio tuberculis duobus elevatis instructo; scutello lutescente, basi obscuriori, carinâ elevatâ dorsali ad apicem extensâ, (ante medium paullo latiori et postice attenuatâ); antennis fuscis, pedibus anticis nigricantibus, 4 posticis luteis.

Long. corp. lin. $5\frac{1}{4}$.

Habitat in Brasilia. Mus. Reg. Berol., nostr. ♂ ♀.

Macrocephalus affinis, Guérin, Icon. R. An. Ins. pl. 56, fig. 10. *M. tuberculatus*, Klug, MSS.

Caput rugoso-punctatum, lineis duabus impressis ante ocellos. Antennæ fuscæ, apice articuli quarti rufescenti. Thorax lateribus valde emarginatis, parte posticâ dilatatâ colore clariori, abdomen luteum. Scutellum basi subpunctatum, postice coriaceo-granulatum, corium hemelytrorum luteum. Tubercula elevata thoracis, antice lunulâ fuscâ plus minusve conspicuâ ornantur.

Sp. 9. *Macrocephalus prehensilis*, Fabricius.

M. pallidè griseo-lutescens; capite et thorace supra (margine tenuissimo laterali excepto) nigris aut obscurè fuscis, hujus angulis posticis obtusis integris; antennis articulis terminalibus fuscis, scutello lineâ dorsali late nigrâ, carinâ centrali tenuissimâ parum elevatâ, et versus basin coloris albidi; pedibus lutescentibus, hemelytrorum corio lutescenti, membrana hyalina.

Long. corp. lin. $2\frac{1}{2}$.

Habitat in Georgia Americæ. In Mus. Reg. Berol. et nostro (e Mus. Haworthii).

Fabricius, Syst. Rhyng. p. 123, No. 8. (*Syrtis prehensilis.*)
Wolff, Icon. Cimic. t. 17, f. 164. (E Carolina.)
Obs.—Fabricius species duas forsan his verbis confundit: "Color variat nunc griseus punctis aliquot scutelli nigris, nunc niger scutello griseo lineâ dorsali late nigrâ. Corpus semper griseum."

Sp. 10. *Macrocephalus pallidus.* (n. s.)

M. pallidè luteo-ochraceus, scutello lutescenti, undique punctato, lineâ tenui dorsali lævi, thorace lateribus subemarginatis angulis posticis obtusè productis, disco antico lineis tribus subelevatis punctisque quatuor profundis, transversè positis ante medium disci; pedibus, antennis et corpore subtus concoloribus, abdomine magis fulvo; hemelytrorum corio luteo, membrana hyalina.
Long. corp. lin. $2\frac{2}{3}$.
Habitat in Georgia Americæ. Mus. nostr.
Obs.—*M. prehensili* affinis, at major.

Sp. 11. *Macrocephalus macilentus.* (n. s.) (Tab. 2, fig. 6.)

M. elongatus, angustus, punctatus, squamis minutis albidis obsitus; capite supra cum antennis fuscis; thorace antice luteo-fulvo, parte posticâ vix elevatâ fuscâ, angulis posticis prominentibus acutis, scutello fusco ad basin subferrugineo, carinâ centrali parum elevatâ.
Long. corp. lin. $3\frac{3}{4}$.
Habitat in Colombia. D. Lebas. In Mus. Reg. Parisiis.
Abdomen oblongum, lateribus parallelis, postice rotundatum. Caput et thorax cum pedibus anticis pallidè luteo-fulvis, pedibus 4 posticis brunneis, femoribus basi lutescentibus. Abdomen subtus pallidè luteo-rufescens.

There still remains to be described a remarkable insect which I have only seen in the collection of the Jardin des Plantes, which seems intermediate between *Macrocephalus* and *Phymata*, agreeing with the former in its general characters, and with the latter in the diminished size of the scutellum. The structure of the antennæ and the neuration of the hemelytra however clearly prove this insect to be nearest to the genus *Macrocephalus*. It will be necessary, consequently, to establish a distinct sub-genus for its reception, which may be termed

Oxythyreus, from the acute apex of the scutellum.

Antennæ (fig. 7 *a*) capite longiores; articulo 1mo crasso, 2do et 3tio brevissimis, 4to præcedentibus simul sumtis duplo

longiori subcylindrico, in canali ad latera thoracis haud receptæ. Caput brevius, antice bifidum. Thorax angulis posticis acutis prominulis. Scutellum triangulare, postice acutum, et ad medium abdominis fere attingens. Hemelytrorum venæ fere ut in *Macrocephalis veris* dispositæ (fig. 7 *b*). Abdomen ovatum, planum, lateribus in medio in angulum haud productis, thorace multo latius (fig. 7 *c*, extremity of the female abdomen).

Sp. 1. (12.) *Macrocephalus* (*Hemithyreus*) *cylindricornis*. (n. s.) Tab. 2, fig. 7.

Totus pallidè rufescenti-lutescens, punctatus, pedibus nonnihil pallidioribus, membrana hemelytrorum hyalina, thorace postice vix elevato, angulis posticis prominulis, acutis.

Long. corp. lin. $5\frac{1}{2}$.

Habitat ignotus. In Mus. Reg. Parisiis.

III. *Description of a new Sub-Genus of Exotic Hemipterous Insects.* *By* J. O. Westwood.

[Read 6 November, 1837.]

Since the last meeting of this Society,—at which I read a monograph on the genus *Macrocephalus* of Swederus, (a group distinguished by the large size of the scutellum, which entirely covers the abdomen), and in which it became necessary to establish a sub-genus upon an insect in the national museum of France, having the scutellum only extending half the length of the abdomen, and very acutely pointed at its tip—I have met with another singular group belonging to the same genus in the essential characters of the form of the body, and in the general disposition of the veins of the apical membrane of the hemelytra; but likewise differing in the small size of the scutellum, which is rounded at its tip, and which cannot be associated with the subgenus *Oxythyreus* above mentioned. From the obtuse form of the short scutellum, which is its most characteristic distinction, it may be named subgenerically

Amblythyreus.

Corpus planum, lateribus valdè dilatatum.

Caput angustum, oblongum, apice bifidum, oculis lateralibus, ocellis 2 posticis.

Antennæ articulo 1mo crassiori, duobus proximis minutis, ultimo magno ovali.

Prothorax postice parum elevatus, at multum dilatatus, angulis posticis acutis porrectis, parum retro directis, dorso tricarinatus.

Scutellum mediocre, ad medium abdominis attingens, planum, apice rotundatum.

Hemelytra ad apicem abdominis attingentia, membranâ apicali maximâ venis 5 longitudinalibus, postice obliquè connexis, duabus internis ad angulum internum areolam rotundatam efficientibus. (Pl. 2, fig. 8 *a*.)

Abdomen planum, latissimum, rhombiforme, thorace duplo latius, lateribus hemelytris haud obtectis.

Pedes antici raptorii ut in *Macrocephalo*, at magis elongati, postici 4 breves simplices.

I do not know that any rule has hitherto been proposed for the regulation of the nomenclature of sub-genera. Is it, for instance, determined whether, in cutting up a genus into *sub-genera*, the same rule should be preserved as in cutting up an old *family-genus* into *genera*, namely, that the old *generic* name should also be still employed, *subgenerically*, for the typical sub-genus? Dr. Horsfield, in the *Lepidoptera Javanica*, and other subsequent authors, have adopted this plan, giving the typical species of *Thecla* (for instance) as forming the sub-genus "*Thecla, strictè sic dicta.*" Mr. Robert Brown has pursued a different plan. His rule is to give to the inferior groups a cognomen, introduced parenthetically between the generic and trivial names. Thus, taking his own illustration, given in the botanical appendix to the Narrative of Travels and Discoveries in Northern and Central Africa, *Cleome pentaphylla*, which is the species on which the genus was chiefly founded, but which has an æstivation so remarkable, that it might constitute a separate sub-genus, to be named *Gymnogonia*, should have its names thus expressed, *Cleome* (*Gymnogonia*) *pentaphylla*. By thus employing the sub-generic name, the principal group would be kept in view, whilst its subdivisions would be carried to the same extent, and the subordinate groups as well expressed as if they had been actually separated into distinct genera.

In this manner of treating the names it will be seen that the *typical* species of the old genus receives a subgeneric name distinct from its generic. And it is in this manner that Mr. M'Leay

has treated the nomenclature of the subgenera or types of form of the genus *Scarabæus* in the *Horæ Entomologicæ*, as thus arranged :—

Genus Scarabæus.

Sub-Genus 1. Scarabæus (Heliocantharus) *Sacer*.
2. Scarabæus (Mnematium) *Ritchii*.
3. Scarabæus (Pachysoma) *Æsculapius*.
4. Scarabæus (Gymnopleurus) *pilularius*.

It is not for me to decide upon the greater propriety of either of these plans. If the plan of Dr. Horsfield be adopted, the subgenera of *Macrocephalus* will stand thus :—

Genus Macrocephalus.

Sub-Genus 1. Macrocephalus (Stricte sic dictus) *Cimicoides*.
2. Macrocephalus (Oxythyreus) *Cylindricornis*.
3. Macrocephalus (Amblythyreus) *Rhombiventris*.

If, on the other hand, the plan of Brown and M'Leay be retained, they will stand thus :—

Genus Macrocephalus.

Sub-Genus 1. Macrocephalus (Macrothyreus) *Cimicoides*.
2. Macrocephalus (Oxythyreus) *Cylindricornis*.
3. Macrocephalus (Amblythyreus) *Rhombiventris*.

The name *Macrothyreus* being now first proposed, in allusion to the large size of the scutellum in the typical species.

Of the third of these sub-genera, I have seen but a single species, of which two specimens, in a mutilated state, are preserved in the collection of the Linnæan Society.

Macrocephalus (*Amblythyreus*) *rhombiventris*. (n. s.) (Pl. 2, fig. 8.)

Læte fulvo-luteus, opacus, lævis, capite supra postice et thoracis parte posticâ nigricantibus, angulis lateralibus abdominis maculâ fuscâ maculâque utrinque versus apicem, hemelytrorum membranâ fuscescenti, abdomine in medio sub alas rufescenti. Corpus totum subtus, cum pedibus, fulvo-luteum.
Long. corp. lin. 6.
Habitat ——?
In Mus. Soc. Linn. Lond.

Additional species of the last described sub-genus [1841] :—

Macrocephalus (*Amblythyreus*) *quadratus*. (n. s.)

Pallidè luteo-fulvus, punctatus, capite et articulis tribus basalibus antennarum magis brunneis, concoloribus, pronoti angulis lateralibus acute productis fuscis margineque postico obscuro, abdomine angustiori quadrato, angulis lateralibus obscuris.

Long. corp. lin. 5 ; lat. abdom. lin. 3.

Habitat in India Orientali. In Mus. nostr.

Corpus subtus cum pedibus et rostro pallidè luteum, abdomine maculis nonnullis mediis carneis. Pronotum marginibus lateralibus serrulatum, angulis valde prominentibus ut in præcedente, lineâ impressâ longitudinali mediâ, alterisque duabus elevatis. Abdomen in medio sub tegmina carneum, angulis lateralibus apiceque fuscatis. Corium hemelytrorum luteum, venis ad apicem ejus carneis ; membrana parum fuscescenti, venis obscuris ; alarum vena basali externa crassa carnea.

Macrocephalus (*Amblythyrcus*) *angustus*. (n. s.)

Niger, thorace abdomineque angustioribus, prothoracis marginibus lateralibus fulvis, disco posticè subrufo, abdomine fulvo fasciâ mediâ nigrâ, scutello angustiori.

Long. corp. lin. 5. Lat. abdom. lin. $2\frac{1}{2}$.

Habitat ——? In Mus. Britann.

Pronotum marginibus lateralibus vix emarginatis serrulatis, fulvis, disco posticè subrufo ; scutellum fulvum, hemelytra fusca, membrana pallida venis nigris. Abdomen, quam in præcentibus duabus speciebus, multo angustius, fulvum, fasciâ transversâ mediâ nigrâ ; apice rufo.

Corpus subtus fulvum, capite nigro, antennis nigris, basi articuli ultimi rufescenti. Rostrum fulvum.

IV. *A Descriptive List of the Species of Popillia, in the Cabinet of the* Rev. F. W. Hope, M.A., *with one Description added, from a Specimen in the British Museum.* By Edward Newman.

[Read May, 1838.]

In offering to the Entomological Society these descriptions of the species of the lamellicorn genus *Popillia*, I cannot forego the opportunity thus afforded me of bearing my testimony to the liberality with which Mr. Hope's matchless cabinet is thrown open to Entomologists. It gives me much pleasure to acknowledge, not only the great advantages I have personally received from this copious source of information, but also the prompt and uniform kindness with which my inquiries have been assisted. I consider Mr. Hope's liberality, in thus affording free access to his collections, a general advantage to science, and likely to assist materially in establishing for the Entomologists of this country a far higher reputation than they have hitherto enjoyed.

As the species of this genus appear very numerous, I have preferred confining myself, with a single exception, to those in Mr. Hope's cabinet: any attempt to monograph the genus must at present prove a failure.

With regard to specific names, I have already fully expressed my views in another place, and it is only necessary in addition to state, that I consider names, unaccompanied by descriptions, to be entirely valueless; and acting on this view of the subject, I totally disregard those published lists of words, which are designed to impose names on certain species, without the labour of describing them: so far from believing that such lists will, among men of science, impose names on the species which they are supposed to represent, I believe the greater, and by far the better portion of Entomologists, agree with myself, in considering them mere trash. Again, the practice of attempting to supersede a published and received name by an unmeaning word, of which hundreds of instances occur in two lists published respectively in London and Paris, bespeaks an egotism almost too ridiculous to excite our anger, and an ignorance of scientific usages more to be pitied than censured. It however frequently occurs, that in an extensive collection, like that of Mr. Hope, manuscript names are attached to specimens by the owner, and in describing such species, especially if they are not to be found elsewhere, it

becomes a matter of courtesy to adopt the names thus proposed, unless a suitable reason can be given for doing otherwise.

But little appears to be known of the species of *Popillia*, except as they exist in collections. There is, however, no doubt of their subsisting on living vegetables; and from the various close relations exhibited in their structure with that of the *Phyllopertha horticola*, I am inclined to believe their principal food to be the petals of flowers.

The generic name *Popillia* appears to have been proposed by Dr. Leach, but I cannot find that that learned Entomologist has ever assigned it characters. The genus has, however, been frequently described under the name, and is therefore fully established. *Trichius bipunctatus* of Fabricius, an insect not unfrequent in the neighbourhood of the Cape of Good Hope, appears to be taken as the type.

Genus Popillia, *Leach.**

Head porrected, flat, as far as the eyes immersed in the prothorax; clypeus separated by a transverse suture; eyes distant, lateral; antennæ as long as the head, inserted in front of the eyes and beneath the clypeus, and composed of nine joints, the first elongate and somewhat club-shaped, the second very short and nearly globular, the third longer, externally somewhat incrassated; the three following are somewhat cup-shaped and much diminished in length, the remaining three are produced laterally, lamelliform, and together form an elongate clava: labrum concealed beneath the clypeus, slightly emarginate, mandibles incurved at the apex and bifid, below the apex furnished with a

* It seems allowable to observe, that an abstract of the following pages, containing descriptions of each species, was published in the "Magazine of Natural History," for June, 1838. I am not aware that any species then characterized has since been described by any other writer; but as Entomologists have been manifesting a most wholesome and laudable spirit of activity during the four years that have elapsed since these memoranda were arranged for publication (*viz.* in the winter of 1837-8), I think it but fair to date my names from the day when they first actually appeared before the public, clothed in the dress which science prescribes. It may not be amiss also to state, that during this long interval several new species have come to my knowledge; and I have reason to believe that many others have reached this country and the continent of Europe. I shall gladly describe these at any future time, should an opportunity be kindly allowed me by their various possessors.—E. N. November 15, 1841.

membranous lobe, which is hirsute in front; below this hirsute membranous lobe is a broad flat corrugated and corneous surface presented to a similar part in the opposite mandible, these surfaces meet each other in the manner of molar teeth: the maxillæ are of equal length with the mandibles; the galea is incurved, and divided into five acute teeth; below these a small hirsute lacinia is visible; the maxipalpi are four-jointed, the second joint is rather longer than the first and third, the fourth is longer than the second, and nearly cylindrical: the labium is elongate, its lateral margins are convex in the middle, but considerably restricted both above and below the middle, the apex is slightly emarginate; near its apex, in a lateral cavity on each side, are situated the labipalpi, these are shorter and three-jointed, the joints of nearly equal length and bulk: the prothorax is very convex, nearly thrice as broad as the head, its posterior margin is flexuose; the scutellum is large and triangular; the meso-sternum is produced in a point, which extends forwards to the insertion of the fore legs: the elytra are rather wider than the prothorax, dorsally they are tolerably flat, and posteriorly they are abbreviated and truncated, leaving the terminal portion of the abdomen covered; the middle and hind tibiæ have three transverse series of acute spines on their exterior surfaces, the apical joint of all the tarsi is long, nearly equalling the other four united: the unguiculi of the fore and middle legs are of unequal size; in each pair the larger unguiculus is bifid, those of the posterior pair are nearly equal.* The underside of the abdomen is invariably pilose, except in the first species, *P. regina;* this pilosity is often, indeed mostly, confined to the margins of the segments, and is particularly apparent along the side, giving the appearance of a row of whitish spots. I have found that these spots vary exceedingly in the same species, and are not unfrequently different on the two sides of the same individual; this circumstance has led me to believe their appearance dependent in a great measure on the recent or worn state of the specimen, more particularly as they are so situated as to be constantly exposed to friction from the meta-femora: being therefore dissatisfied with the variations of this pilosity as affording specific distinctions, I have in the following descriptions left it entirely unnoticed.

* Plate 3, fig. 1 *a*—*n*, represent the generic details from *P. bipunctata*. 1 *a*, labrum; 1 *b*, mandible; 1 *c*, ditto, seen in front; 1 *d*, maxilla; 1 *e*, labium; 1 *f*, antenna; 1 *g*, front of body seen sideways; 1 *h*, fore tarsus, male; 1 *i*, ditto, female; 1 *k*, middle tarsus, male; 1 *l*, ditto, female; 1 *m*, hind tarsus, male; 1 *n*, ditto, female.

The normal form of *Popillia*, as exhibited in *P. bipunctatus*, the *Trichius bipunctatus* of Fabricius, is peculiar to the old continent, and seems to be nearly confined to the intertropical regions. The aberrant form, as exhibited in *Popillia sticticollis*, appears to be exclusively Mexican.

I have divided this genus into groups, assigning to each characters for which I claim no higher importance than that of convenience; and I wish it particularly to be understood, that I attach to these characters no value whatever, for I doubt not that I may be detected in having dismissed similar ones as of too little weight, even for the establishment of a species. Still that they are useful, will not, I think, be disallowed, and any guide to the ready discrimination of species I have always found acceptable.

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* *Asiatic Group.*

Striæ of the elytra typically 13; four striæ on each side of the suture, are distinct and uninterrupted; the elytra have no dorsal excavation; terminal segment of the abdomen glabrous and immaculate; the legs are comparatively slender.

1. Popi. Regina.

Omnino lætè viridi-ænea, glabra, splendidissima; antennæ nigræ; elytra profundè striata, lateribus medio impressis; striis punctis 1°, 2°, 3°, 4°, 7°*que integris, cæteris interruptis; mesosternum valdè productum, curvatum.* (Corp. long. ·7 unc., lat. ·4 unc.)

Colour.—This brilliant insect is entirely of a resplendent green colour, with black antennæ.

Sculpture.—Head thickly punctured anteriorly; the prothorax has some very minute scattered punctures on its disk, and others deeper and more conspicuous near its margin: each elytron has thirteen striæ, of these the four nearest to the suture are uninterrupted; the fifth is imperfect and interrupted, it occupies the summit of a raised space between the fourth and sixth, which last is imperfect towards the apex of the elytron; the seventh is nearly entire; the remainder are variously interrupted.

Received from the Nilghery Mountains, in the East Indies.

** *African Group.*

Striæ of the elytra typically eleven; one stria on each side of the suture distinct; the elytra have no excavation dorsally; the terminal segment of the abdomen has constantly two conspicuous spots, composed of white hairs; the legs in this group are very robust.

2. Popi. dorsigera.

Nigro-ænea, elytrorum fasciâ mediana transversâ communi fulvâ; podex brunneus, pilis albis bisignatus; elytra striata, striis punctis, et, 1° excepto, abbreviatis. (Corp. long. ·75, lat. ·4 unc.)

Colour.—Head and prothorax deep metallic green, approaching to black; elytra nearly black, and having a transverse fulvous fascia common to both, and nearly equidistant from their base and apex; the terminal segment of the abdomen is brown, with two conspicuous white spots; the legs are brown, with a metallic tint.

Sculpture.—Head thickly punctured; prothorax thickly punctured anteriorly and laterally, but somewhat more sparingly towards the posterior margin; scutellum punctured thickly at the base, more sparingly towards the apex; the elytra are striated, but the first or sutural stria is the only one which reaches the apex of the elytron; the others cease at about two-thirds of their length; the second is composed of scattered punctures.

Inhabits Africa, whence it was brought to England by Captain Tuckey. I believe this insect to be unique in the cabinet of the British Museum.

3. Popi. brunnea.

Nigra; clypeo, antennis, elytris pedibusque castaneis, metatarsis piceis; podex pilis albis bisignatus; elytra striata, striis 1°, 2°, 4°que subintegris. (Corp. long. ·65, lat. ·4 unc.)

Colour.—Black, with the clypeus brown, and the antennæ testaceous; the elytra are brown, with the suture and margins nearly black; the legs are brown, but of a lighter shade than the elytra; the terminal segment of the abdomen is brown, with two conspicuous white spots.

Sculpture.—Head thickly punctured; prothorax thickly punctured anteriorly and laterally, but perfectly glabrous posteriorly; scutellum sparingly punctured; elytra with five tolerably per-

fect punctate striæ on each, viz. first, third, fourth, fifth and sixth ; the site of the second stria is occupied by an irregular series of scattered punctures.

Inhabits Africa. From the cabinet of the late Mr. Haworth.

4. Popi. Æneas.

Olivacco-viridis antennis pedibusque brunneis, metatarsis piceis ; podex pilis albis bisignatus ; elytra striata, striis P. brunneæ. (Corp. long. ·65 unc., lat. ·375 unc.)

Colour.— Olive green, with the antennæ and legs of a clear brown, approaching testaceous ; the hind tarsi piceous ; the terminal segment of the abdomen above is deep olive green, with two conspicuous white spots ; its extreme point is testaceous.

Sculpture.—Head, prothorax and elytra are punctured as in *P. brunnea*, but the striæ are somewhat deeper and more distinct.

Inhabits Africa. From the cabinet of the late Mr. Haworth.

5. Popi. rufipes.

Nigra ; clypeo sordidè, antennis pedibusque lætè castaneis, metatarsis piceis ; podex pilis albis bisignatus ; elytra striata, striis fere P. brunneæ. (Corp. long. ·55 unc., lat. ·35 unc.)

Cetonia rufipes. Fabricius, Syst. Eleu. ii. 139.

Cetonia 4-punctata. Olivier, Vol. i. No. 6, p. 80 and p. 101 ; *Cetonia*, Tab. X. Fig. 93.

Colour.—Black, with the clypeus piceous, the antennæ and legs brown, the hind tarsi piceous ; the terminal segment of the abdomen above has two conspicuous white spots.

Sculpture.—The head, prothorax, scutellum, and elytra, are punctured as in *P. Æneas*, the same distinctions in the striæ of the elytra being observable.

I have no doubt that this is the *Cetonia rufipes* of Fabricius, and the *Cetonia 4-punctata* of Olivier. The description of both authors agree in every particular with the specimen before me, but Olivier's figure is very bad. Should it turn out that I am mistaken in this, the name will still stand, as there is no other insect described under the name of *Popillia rufipes*.

Inhabits Africa. From the cabinet of the late Mr. Haworth.

The close resemblance between the three insects above described leads me to fear that they may be varieties of a single species ; but in the total absence of any evidence on this subject, and also of all accurate or precise knowledge of their habitat and

geographical range, it would be presuming too far to describe them as such, particularly as their facies is so entirely different. A difficulty of this kind must always occur in instances like the present, in which single individuals only are accessible to the describer.

6. Popi. bipunctata.—Plate 3, fig. 1, and details.

Nigra, nitida, elytris testaceis, pedibus nigris; podex pilis albis bisignatus; elytra striata, striis fere P. brunneæ. (Corp. long. ·55 unc., lat. ·325 unc.

Trichius bipunctatus. Fabricius, Syst. Eleu. ii. 132.

Melolontha bipunctata. Olivier, i. 5. Tab. VI. Icon. 69.

Colour.—Head, prothorax, scutellum, legs and abdomen black, with an obscure metallic tint; elytra testaceous; terminal segment of the abdomen above with two conspicuous white spots.

Sculpture.—Head thickly punctured; prothorax thickly punctured anteriorly and laterally; elytra with ten striæ; the first stria is entire; the second is very obscure, being nothing more than an irregular series of punctures; the third to the sixth are tolerably regular; after that all are more or less interrupted towards the base.

Inhabits the Cape of Good Hope, and appears not to be uncommon.

7. Popi. olea.

Olivaria, luce varians; antennis elytrisque testaceis, fulgore metallico nitidis; pedes testacei fulgore cupreo nitidi; podex pilis albis bisignatus; elytra 11-*striata, striis punctis et* (2° *interrupto* 10°*que abbreviato exceptis*) *integris.* (Corp. long. ·5 unc., lat. ·3 unc.)

Colour.—Olive green, varying in tint with a varied position of light; the antennæ and elytra are testaceous, but have a refulgent metallic greenish gloss; the legs are testaceous, with a coppery gloss; the terminal segment of the abdomen above is coppery green, with two conspicuous white spots.

Sculpture.—The head and prothorax are thickly punctured, the scutellum sparingly so; the elytra have eleven punctate striæ, of which the second from the suture is composed of scattered punctures, the tenth is abbreviated, the remainder are nearly entire.

Inhabits Africa.

*** *Asiatic Group.*

The striæ typically ten; the second stria from the suture differs but little from the rest; each elytron has a deep excavation dorsally; the two spots on the terminal segment of the abdomen are occasionally, not constantly present.

8. Popi. mutans.

Castanea, fulgore metallico mutanti nitida; antennis pedibusque concoloribus; podex haud signatus; elytra striata, utrinque prope suturam profundè foveata. (Corp. long. ·45 unc., lat. ·375 unc.)

Colour.—Brown, but completely covered with a varying bronzy lustre; the antennæ and legs are concolorous with the other parts.

Sculpture.—The head is thickly punctured; the prothorax is punctured anteriorly and laterally; the scutellum is punctured sparingly and variously in different specimens; the elytra are nearly flat; the striæ are punctate, the second stria is situated very near the first, but is scarcely less entire; on each side of the suture, just below the scutellum, is a deep and conspicuous fovea.

Inhabits the East Indies.

9. Popi. chlorion.

Obscurè viridis, nitida; antennæ piceæ; pedes chalybeo-nigri; podex pilis albis bisignatus; elytra striata, utrinque prope suturam profundè foveata; striis haud punctis. (Corp. long. ·4 unc., lat. ·25 unc.)

Colour.—Dark bottle green, shining; antennæ and legs black, with a steely blue reflection; the terminal segment of the abdomen above has two white spots.

Sculpture.—The head is thickly punctured; the prothorax is punctured anteriorly and laterally; the elytra are striated, but the striæ are not punctured; on each side of the suture is a deep transverse fovea, just below the scutellum.

Inhabits the East Indies. Received from Madras.

10. Popi. cyanea.

Lætè chalybeo-cyanea, pedibus concoloribus; antennæ nigræ; podex nullo modo signatus; elytra striata, prope suturam utrinque pro-

fundè foveata, striis punctis. (Corp. long. ·4 unc., lat. ·25 unc.)

α *Popi. cyanea.* Hope, Zoological Miscellany, p. 23.

β *Popi. beryllina.* Hope, Præcedenti affinis; supra tota viridi-cyanea. Sine dubio eadem species.

γ *Popi. somnulosa. Obscurior, latior; elytrorum foveæ minores at profundiores cætera P. cyaneæ* α.

Received from the Himalaya Mountains in Thibet by Mr. Spencer, and presented to me by that gentleman.

Colour.—Uniform beautiful dark blue, the legs being of the same colour, and the antennæ black; the terminal segment of the abdomen is without spots.

Sculpture.—The head and prothorax are punctured, but on the latter the punctures are very sparingly scattered posteriorly; the scutellum is sparingly punctured; the elytra are striated, and the striæ deeply punctured; on each side of the suture is a deep transverse fovea, just below the scutellum.

Inhabits the East Indies. Communicated by the late General Hardwick.

11. Popi. Adamas.

Nigro-cyanea, nitida, pedibus concoloribus; antennæ nigræ; podex pilis niveis bisignatus; elytra striata, utrinque prope suturam profundè foveata, striis punctis. (Corp. long. ·45 unc., lat. ·25 unc.)

Colour.—Dark shining indigo colour, with black antennæ and legs, the latter exhibiting blue reflections; the prothorax has a margin of white hairs, and the terminal segment of the abdomen has two conspicuous white spots.

Sculpture.—The anterior part of the head is thickly punctured; the prothorax is very sparingly punctured, particularly near the centre and posterior margin; the scutellum has about thirty punctures; the elytra are striated, and the striæ are punctured, but not very deeply; on each side of the suture is a deep fovea, just below the scutellum.

Inhabits the East Indies.

12. Popi. complanata.

Caput, prothorax et scutellum viridi-ænea; clypeus castaneus, antennæ castaneæ, capitulo nigro; elytra testacea, complanata, puncto-striata, utrinque prope suturam vagè foveata; pedes castanei,

fulgore metallico nitidi; podex nigro-æneus, pilis albis bisignatus. (Corp. long. ·45 unc., lat. ·275 unc.)

Colour.—Head metallic green, with the clypeus brown; prothorax and scutellum metallic green, the lateral margins of the former clothed with grey hairs; elytra testaceous; the terminal segment of the abdomen is black, with a cupreous metallic tint, and has two white spots; the legs are brown, with metallic tints; the tarsi piceous.

Sculpture—Head thickly punctured, especially between the eyes; the disk of the prothorax sparingly and slightly punctured, the lateral margins punctured more coarsely; the elytra are very flat, they have punctured striæ, between the first and second is a series of punctures extending from the base nearly half the length of the elytra, on each side of the suture is a very evident but not deep fovea, just below the scutellum.

Inhabits the East Indies.

13. Popi. lucida.

Chalybeo-æneа; antennæ piceæ; elytra testacea; pedes castanei, fulgore metallico nitidi; podex pilis niveis bisignatus; elytra striata, utrinque prope suturam profundè foveata, striis punctis. (Corp. long. ·3 unc., lat. ·2 unc.)

Colour.—Dark chalybeous blue, or metallic green, with piceous antennæ; the prothorax has a margin of white hairs, and the terminal segment of the abdomen has two white spots.

Sculpture.—The head is thickly punctured, especially between the eyes; the prothorax is deeply punctured, with the exception of its posterior margin, and the punctures are more profound than in the preceding species; the scutellum is very shining, and sparingly punctured; the elytra are striated, and the striæ punctured; between the first and the second striæ are a few scattered punctures near the scutellum.

Inhabits the East Indies.

14. Popi. minuta.

Sordidè æneа; antennæ nigræ; pedes nigro-æneі; elytra testacea, marginibus suturaque nigro-æneis; podex pilis albidis bisignatus; elytra striata, prope suturam utrinque profundè foveata; striis punctis. (Long. corp. ·3 unc., lat. ·2 unc.)

Popi. minuta. Hope, Zoological Miscellany, p. 23.

Colour.—Head, prothorax and scutellum metallic green, with a

coppery or rosy tinge; antennæ and legs nearly black, with a varying metallic lustre; elytra testaceous, with the suture and margins nearly black, but tinged with a metallic lustre; the terminal segment of the abdomen above has two whitish spots.

Sculpture.—The head and prothorax are deeply and coarsely punctured, much more so than in any previously described species of this group; the elytra are striated, the striæ regularly punctured; between the first and second striæ, near the base, are twelve or fourteen scattered punctures; on each elytron near the suture is a deep transverse fovea, just below the scutellum.

Inhabits the East Indies.

**** *Asiatic Group.*

The striæ typically 10; the second stria from the suture interrupted or wanting; the elytra have no dorsal excavation; the terminal segment of the abdomen above has constantly two conspicuous spots composed of white hairs.

15. Popi. cupricollis.

Cuprco-ænea; antennæ nigræ; pedes nigro-ænei; tarsis aterrimis; elytra testacea, fulgore metallico nitida; podex pilis albis bisignatus; elytra striata, striis punctis. (Corp. long. ·425 unc., lat. ·325 unc.)

α *P. cupricollis.* Hope, Zoological Miscellany, p. 23, *vide supra.*

β *P. suturata.* Elytra testacea suturâ æneâ; cætera *P. cupricollis.*

γ *P. formosa.* Hope, Zoological Miscellany, p. 23. Elytra purpurea, fulgore metallico nitida; cætera *P. cupricollis.*

δ *P. smaragdula.* Hope, Zoological Miscellany, p. 23. Elytra viridi-ænea, fulgore metallico nitida.

Colour.—α *P. cupricollis*, the normal appearance. Head, prothorax and scutellum golden green; antennæ black; elytra testaceous; legs bronzed; tarsi very black; the terminal segment of the abdomen above is golden green, with two conspicuous white spots.

β *P. suturata* differs only in having the region of the suture of the elytra of a bright golden green.

γ *P. formosa* differs only in having the elytra purple, with a beautiful metallic lustre.

Sculpture.—Head thickly punctured; prothorax punctured throughout, but the punctures smaller and more distant near the posterior margin; the prothorax moreover has in some specimens two deep discoidal foveæ; these vary in each individual, but their site is always observable; the scutellum is punctured anteriorly, but smooth posteriorly; the elytra are striated, and the striæ punctured; the first stria is very distinct, the second and third are composed of scattered punctures, and unite before reaching the apex of the elytron; the other dorsal striæ are tolerably distinct, the lateral ones are more interrupted.

Inhabits the East Indies. Communicated from Nepaul, by the late General Hardwick.

In this species the impressions on the prothorax would appear to indicate a higher distinction than a mere variety; but on looking over a series of *Anisoplia*, a closely allied genus, I find in the same species individuals not only possessing prothoracic foveæ, while others are entirely without them, but some have a deep longitudinal sulcus on the prothorax, while in others not a trace of this sulcus can be found.

16. Popi. Japonica.

Cupreo-ænea; antennæ piceæ, capitulo nigro; pedes viridi aut cupreo-ænei, tarsis nigris; elytra testacea, suturâ marginibusque nigro-æneis; podex pilis albis bisignatus; elytra striata, striis punctis. (Corp. long. ·45 unc., lat. ·275 unc.)

Colour.—Coppery-golden green; antennæ piceous, with black lamellæ; elytra testaceous, with black suture and margin; the legs are of a dark metallic coppery or green colour, varying in tint in different positions; the tarsi are extremely black; the terminal segment of the abdomen is more elongate and pointed than in the preceding species, and is marked with two white spots.

Sculpture.—The head is thickly and coarsely punctured; the prothorax is coarsely punctured throughout, but rather more sparingly posteriorly; the scutellum is punctured except at the apex; the striæ of the elytra are deeply punctured; the second stria is imperfect, terminating considerably before the apex of the elytra.

Inhabits Japan.

17. Popi. virescens.

Lætè ænea, nitidissima; elytra testacea, fulgore metallico nitida; antennæ testaceæ, capitulo nigro; pedes brunnei, fulgore cupreo micantes, metatarsis piceis; podex æneus, pilis albis bisignatus. (Long. corp. ·45 unc., lat. ·3 unc.)

Popi. virescens. Hope, Zoological Miscellany, p. 23.

Colour.—Golden green, very brilliant; antennæ testaceous, with black lamellæ; the elytra are testaceous, with a beautiful metallic splendour; the legs are brown, with splendid metallic tints, the hind tarsi are piceous; the terminal segment of the abdomen above is golden green, with two white spots.

Sculpture.—The head is thickly punctured; the punctures of the prothorax are scattered and very minute; the scutellum is nearly impunctate; the striæ of the elytra are punctured, the punctures are distant and irregular.

Inhabits the East Indies. Communicated from Nepaul, by the late General Hardwick.

18. Popi. marginicollis.

Lætè ænea nitidissima; clypeo, antennis, prothoracisque marginibus testaceis; elytra testacea, suturâ æneâ; pedibus testaceis, fulgore metallico nitidis; elytra striata, striis punctis; podex æneus, pilis albis bisignatus. (Corp. long. ·45 unc., lat. ·275 unc.)

Popi. marginicollis. Hope, Zoological Miscellany, p. 23.

Colour.—Bright golden green, with the clypeus, antennæ and margins of the prothorax testaceous; elytra testaceous, with a green suture; legs testaceous, with a metallic tint; the terminal segment of the abdomen above golden green, with two conspicuous white spots.

Sculpture.—Head thickly punctured; prothorax thickly punctured, but the punctures so minute as only to be visible under a lens of high power; scutellum with a few scattered punctures; the striæ are much more regular than in the preceding species of this group.

Inhabits the East Indies. Communicated from Nepaul, by the late General Hardwick.

19. Popi. biguttata.

Lætè ænea; antennæ nigræ; elytra testacea, suturâ æneâ, apice latè nigro; pedes ænei, tarsis nigris; podex æneus, pilis albis bisignatus; elytra striata, striis punctis. (Corp. long. ·35 unc. lat. ·2 unc.)

Melolontha biguttata. Wiedemann, in Germar's Magasin der Entomologie, tom. iv. p. 136.

Colour.—Bright golden green ; the antennæ are black; the elytra are testaceous, with a golden green suture and a black band at the apex, which is prolonged nearly half the length of each exterior margin; the legs are golden green, and the tarsi black ; the terminal segment of the abdomen is golden green, with two white spots ; the legs are golden green, and the tarsi black.

Sculpture.—Head anteriorly thickly punctured, posteriorly nearly smooth; prothorax punctured, but the punctures are excessively minute, and only visible under a lens of high power ; the scutellum has numerous large scattered punctures : the punctures of the striæ are deep and distant, the second stria terminates considerably before the apex of the wing.

Inhabits the Island of Java.

20. Popi. difficilis.

Lætè æneа ; antennæ testaceæ, capitulo nigro ; elytra testacea ; pedes castanei, fulgore metallico nitidi ; podex æneus, pilis albis obscurè bisignatus ; elytra striata, striis punctis. (Corp. long. ·325 unc., lat. ·175 unc.)

Colour.—Bright golden green ; the antennæ are testaceous, with black lamellæ; the elytra are testaceous, with a metallic splendour ; the legs are brown, with a metallic splendour ; the terminal segment of the abdomen is golden green, with two somewhat obscure grey spots.

Sculpture.—The head and prothorax are regularly and rather deeply punctured; the scutellum is very sparingly punctured; the elytra are striated, and the striæ are nearly entire and coarsely punctured.

Inhabits the East Indies.

***** *Asiatic Group.*

The striæ are typically 11 ; the second stria from the suture is not different from the others; the elytra have no dorsal excavation ; the terminal segment of the abdomen is immaculate.

21. Popi. nitida.

Lætè æneа ; antennæ, elytra, pedesque testacea, fulgore metallico

nitida; podex pilis cinereis tectus, nullo modo signatus; elytra striata, striis dorsalibus punctis integris. (Corp. long. ·475 unc., lat. ·25 unc.)

Popi. nitida. Hope, Zoological Miscellany, p. 23.

Colour.—Golden green, shining, with the antennæ, elytra and legs testaceous, and tinged with a metallic splendour; the terminal segment of the abdomen is golden green, and clothed with grey hair.

Sculpture.—The head is thickly punctured, except posteriorly; the prothorax is thickly punctured on the sides only; the scutellum has a few minute scattered punctures; the striæ of the elytra are very regular, and deeply punctured.

Inhabits the East Indies. Communicated from Nepaul, by the late General Hardwick.

22. Popi. nasuta.

Cuprea; antennæ piceæ; clypeus elongatus, recurvus, haud acutus; elytra testacea; pedes nigro-æneï, cupreo-varii, tarsis nigris; podex æneus, nullo modo signatus; elytra striata, striis dorsalibus punctis integris, inter 1am *et* 2am *stria abbreviata puncta.* (Corp. long. ·45 unc., lat. ·275 unc.)

Colour.—Bright copper colour, with piceous antennæ and testaceous elytra, the latter having a fine coppery refulgence; the terminal segment of the abdomen is bright golden green, and perfectly immaculate; the legs are nearly black, with a varied coppery refulgence.

Sculpture.—The clypeus is prolonged, and slightly recurved, its anterior margin is much narrower than in any preceding species; together with the head, it is coarsely punctured; the prothorax is very finely punctured; the striæ of the elytra are punctured, regular, and entire; between the first and second, at the base, is an abbreviated stria, or rather an abbreviated series of scattered punctures.

Inhabits the East Indies.

23. Popi. acuta.

Lætè cupreo-ænea; antennæ castaneæ; clypeus elongatus, recurvus, acutus; elytra pedesque testacea, fulgore metallico nitida; podex æneus, nullo modo signatus; elytra striata, striis dorsalibus punctis integris. (Corp. long. ·45 unc., lat. ·275 unc.)

Colour.—Bright coppery green, with brown antennæ and testaceous elytra and legs, both of which have a brilliant metallic

splendour; the terminal segment of the abdomen is golden green, and immaculate.

Sculpture.—The clypeus is elongated, slightly recurved, and very acute, and, together with the head, is thickly and uniformly punctured; the punctures of the prothorax are very minute; those of the scutellum larger, but very few in number; the elytra are precisely as in *P. nasuta*, to which species it very closely approaches.

Inhabits the East Indies.

24. Popl. rugicollis.

Caput viride, clypeo antennisque testaceis; prothorax rugosus viridis, marginibus testaceis; pedes testacei; elytra testacea sulcata, sulcis punctis; podex nigro-æneus, pilosus, nullo modo signatus. (Corp. long. ·375 unc., lat. ·2 unc.)

Colour.—Head green, with testaceous clypeus and antennæ; prothorax green, with the lateral and posterior margins testaceous; scutellum green; elytra and legs pale brown; abdomen nearly black, the terminal segment above is clothed with grey hairs, and is perfectly immaculate.

Sculpture.—Head coarsely punctured; prothorax very rugose; scutellum irregularly but deeply punctured; elytra sulcated, sulci 11, punctured.

Inhabits the East Indies.

25. Popl. fimbriata.

Nigra; antennæ testaceæ, capitulo nigro; caput et prothorax obscurè virescentia; elytra chalybea, vagè puncto-striata; podex pilis albis transversè manifestè 1-*lineatus.* (Corp. long. ·3 unc., lat. ·175 unc.)

Colour.—Nearly black; antennæ testaceous, with the lamellæ black; head and prothorax dark green; elytra dark indigo blue; legs nearly black, with green and blue shades; the terminal segment of the abdomen has a distinct linear fringe of white hair on its upper margin at its junction with the apex of the elytra.

Sculpture.—Head thickly punctured, prothorax punctured not so thickly as the head, but more deeply, and very regularly; elytra with eleven interrupted series of punctures.

Inhabits the East Indies.

****** *Mexican Group.*

The elytra are without either impressed striæ, or dorsal excavations, but have series of punctures generally arranged in lines; the terminal segment of the abdomen is immaculate.

26. Popi. sticticollis.

Testacea; capitis maculæ duæ posticæ, prothoracis maculæ discoidales 2, marginesque anticus et posticus, scutelli margo, elytrorum sutura margoque lateralis versus apicem nigra. (Corp. long. ·45 unc., lat. ·25 unc.)

Colour.—Testaceous, with the posterior part of the head where received into the prothorax black. This colour extends forwards near each eye, beyond the anterior margin of the prothorax, thus looking like two detached spots. On the prothorax are two detached spots, elongate longitudinally; the anterior and posterior margins are also black: the scutellum has a black margin; the suture of the elytra, and the posterior half of the external margin uniting with the suture, are also black; the entire sternum is black, the femora piceous and the tarsi black. The terminal segment of the abdomen above is perfectly immaculate.

Sculpture.—The head is punctured with tolerable regularity; the punctures are large, but not deep; the prothorax is punctured rather more sparingly than the head; the elytra have no impressed striæ, but have twelve series of punctures, at nearly regular intervals; of these, the second is very diffuse and ill-defined, and seems to be composed of two series of punctures intermixed.

Inhabits Mexico.

27. Popi. vidua.

Nigra, glabra; antennæ testaceæ, capitulo nigro. (Corp. long. ·425 unc., lat. ·25 unc.

Colour.—Black and shining; the antennæ are testaceous, with the lamellæ black; the terminal segment of the abdomen above is perfectly immaculate.

Sculpture.—As in the last.

Inhabits Mexico.

28. Popi. semirufa.

Ferruginea; antennarum capitulus, capitis vertex, prothoracis discus, elytra tota, protibiæ omnino, metatibiarum apices, tarsique undique omnes nigra. (Corp. long. ·425 unc., lat. ·25 unc.)

Colour.—Clypeus ferruginous, crown of the head black; antennæ ferruginous, with the lamellæ black; prothorax black in the centre; the lateral margins broadly ferruginous; elytra entirely black; the under side is entirely ferruginous; the legs also are ferruginous; the fore tibiæ, the apex of the hind tibiæ, and all the tarsi, being black. The terminal segment of the abdomen above is perfectly immaculate.

Sculpture.—As in *P. sticticollis*, and *P. vidua*.

Inhabits Mexico.

The extreme similarity in the sculpture of these three species leads me to suspect the invalidity of the distinctions, which I have derived from colour only.

******* *Mexican Group.*

Striæ of the elytra 9, very deep, sulciform, the two nearest the external margin sesquialterous; the terminal segment of the abdomen above is pilose, but perfectly immaculate.

29. Popi. Castor.

Castanea; prothoracis discus rugosus, margines ochracei; elytra sulcata, sulci profundè puncti, elytrorum humeri nigri. (Corp. long. ·28 unc., lat. ·175 unc.)

Colour.—Head and antennæ brown; the prothorax brown, with a slender margin of pale yellow completely surrounding it; the scutellum is brown, with a green margin; elytra pale ochraceous, with the shoulders black; at the suture, and also towards the apex of each, is a darker shade; the under side is piceous, and very hairy; the legs are brown, with piceous tarsi.

Sculpture.—Head thickly and regularly punctured; prothorax completely rugose, with large, deep and confluent punctures; scutellum with deep, but not crowded punctures; elytra with nine deep punctured sulci, the two on each side nearest the margin being sesquialterous.

Inhabits Mexico.

30. Popi. Pollux.

Nigro-ænea; prothoracis marginibus elytrisque totis testaceis; pedes brunnei, tarsis piceis; elytra sulcata, sulcis profundè punctatis. (Corp. long. ·27 unc., lat. ·16 unc.)

Colour.—Head nearly black, with a metallic tinge; prothorax golden green, with a slender margin of pale yellow completely surrounding it; scutellum golden green; elytra pale testaceous, with the shoulders concolorous, and the suture brown: the legs are brown, and somewhat metallic; the tarsi dark.

Sculpture.—Head thickly punctured; prothorax deeply and regularly, but not very thickly punctured; scutellum with deep but not crowded punctures; elytra with nine deep punctured sulci, the three on each side nearest the margin being sesquialterous.

Inhabits Mexico.

[Descriptions of two additional Assamese species have been published by Mr. Newman in the Magazine of Natural History for July, 1839, under the names of *P. varia* and *P. gemma.* A figure of the latter species has since been published in the Linnæan Transactions, vol. 18, pl. 40, fig. 4. Three other species, from the Philippine islands, have also been described by Mr. Newman in the "Entomologist" for December, 1841; and another, from the Nielgherries, by M. Guérin Méneville, in the Revue Zoologique for February, 1840.—Sec. E. S.]

V. *Description of a new Strepsipterous Insect.* By Robert Templeton, Esq., R. A.

[Read 5th March, 1838.]

Having, whilst at Rio Janeiro, caught a *Sphex* in whose abdomen was inserted the full grown pupa of a *Xenos*, I placed it in spirits with the intention of examining it on my arrival at Colombo. Many things combined to make me regard this little treasure with peculiar interest. I heretofore had only met with an *Elenchus* found in Ireland, and with that which I discovered in the island of Mauritius, described in a former volume of these Transactions, and its minute size threw a veil over many interesting particulars, but I had now hopes of clearing these up to my satisfaction, from the large dimensions, comparatively speaking, of the present specimen; and as the genus was as yet meagre in species, though its congeners, thanks to British industry, were now including very respectable numbers, I was pleased at the prospect of adding another. Besides, Latreille had grounded his change of the name of the order on the details of this very genus, and most possibly some peculiarity of form, some development which we had not found to pertain to *Stylops* or *Elenchus*, might have appeared to sanction it, or at least account for the difference of opinion. I need not say how much I was gratified in perceiving that there was no grounds whatever for the alleged anterior origin of the elytra, even with the latitude which Kirby himself admitted; and in fact, instead of even an approximation to the assigned position, that a wide membranous space intervened, cutting off all immediate connection with the anterior coxæ, so that their origin as elytra must be considered perfectly normal: one thing I was struck with in my contemplation of these little rudimentary bodies, how singularly happy was Kirby's name of the order, as expressive of the appearance they present in this genus, the twisting being in fact their most peculiar character. They are not so broadly spatulate, in proportion to the stipes, as in our English genera, but each appears like a short ribbon, the one end of which was twisted over at right angles to the other. I remember when I first saw them in *Elenchus*, being puzzled to conceive how the twisting could have been selected by Kirby as a dominant quality sufficient to fix the name of the order, but here it is remarkably apparent and expressive; and as every one must be satisfied that the prior name was on the continent too hastily re-

jected, its restoration may be confidently expected with the first good monograph which appears from our foreign fellow-labourers in this branch of scientific research.

I found nothing among the oral appendages which bore the slightest resemblance to a lip, but near the rostrated part beneath is obviously the opening into the pharynx; when the *Xenos* lay upon its back I saw plainly down into it, parts of the interior rising into view as I elevated the platform of the microscope; the edges were corrugated, as if the orifice was capable of considerable change of size and form, and resembled much the mouth of the polypi. I was much struck with the thinness and lancet-like appearance of the mandibles, and with their peculiar articulation, with the lateral plate descending from the ocular pedicle. The whole inferior surface of the head, from the rostrum to the fore legs, was found to be membranous, and to be thrown into folds in various motions of the head.

An error seems to have arisen and been repeated by every one who regarded these little creatures through Mr. Bauer's eyes and a compound microscope;—it consists in supposed vesicles cushioning the tarsus, or a "vesicular membrane capable of being inflated," and the quaint appendix of Kirby, of "the fact of their inflatibility not being ascertained," appears likely to rank some time longer among desiderata. The fact is, all the joints, but especially the terminal, are lobed; and when seen from above, a membrane is observed to extend itself some way in advance of the lobated extremities, and being thin and transparent, suggested, when the outlines became mellowed in the field of a compound microscope, the idea of a vesicle; but when viewed laterally, the truth becomes at once apparent; besides being lobed, the joints are arched transversely; and from within the concavity, and I do believe from an articulation, an appendage of very similar form, not however lobed, passes in advance of the joints; it is very thin, its edges carrying strong spinelike hairs, which also cross the hollow inferior surface in rows, and it is on these the animal is sustained in the quiescent state.

There appeared to me no sufficient reason for the division of the antitrunk into distinct collars or rings, which I think I remember to have seen in sketches from dead specimens; the plates are not continuous round the trunk, but are separate, and united by a tough leathery-looking membrane, in many places thrown into folds, which are not permanent, but made to disappear on moving the head or adjoining plates.

When I proceeded to the examination of the pupa, I disen-

gaged with a little force the case from between the abdominal rings, a very soft but intimate union having subsisted between it and the sheath in which it was placed; when removed, it was about $2\frac{1}{2}$ tenths of an inch in length, almost exactly cylindrical, the inserted extremity rounded, flocculent, and pale yellowish, that exterior, reddish brown, and slightly corrugated, as if from desiccation; when torn asunder, I found the little creature's head occupying this portion, the abdomen having been inserted in the sphex, and the whole body enveloped in a fine transparent membrane, which was closely attached to the thorax and abdomen, and sent off loose processes to give covering to each of the legs, antennæ, palpi and trophi. This membrane exteriorly was rough, as if papillated, but did not seem to lie in immediate contact with the case; and I am led to believe that it contained an albuminous fluid, in which the animal was swimming, for on opening it a slight coagulation ensued when the contents came in contact with the weak spirits. The animal was now exposed, and seemed in excellent condition, and from its appearance gave me no reason to infer that any difference could exist between it in its then state and the perfect insect, with the exception of the undeveloped state of the wings. As you will, from my sketches, at once observe, it has little specifically in common with *Xenos Peckii*, which is the only one with which I can here compare it, and must be still less closely allied to *Xenos Rossii*, if what Dr. Leach states in the Zoological Miscellany be correct, since the abdomen in my insect is not pedunculate, though sensibly lessened in diameter at the base, and most assuredly there are not five joints to the tarsus. I have therefore little hesitation in believing that I have hit upon an undescribed species. In the hope that it may prove so, I take the opportunity of testifying my regard for my learned and indefatigable friend, the Secretary to the Entomological Society, and of ushering into the world my little *Xenos* with a name which will ensure it consideration and respect. I have named it

Xenos Westwoodii.

The head is small, and carries anteriorly two cupped tubercles (C,*o*), separated by a small interval, from whence arise the antennæ, which are rather stout, in proportion to their other dimension. The first joint (C,*p*) is short, subcylindric, a little contracted immediately beyond the base, but dilating towards its articulation with the succeeding joint, beyond which it extends internally, so that when seen from beneath it presents a somewhat triangular appearance. The second joint (*q*) is very minute,

a little longer than broad, and constricted in the middle, beneath appearing as a little cup, from the concavity of which arises the third joint. These two joints are thickly covered with short rigid hairs, in this particular differing essentially from the two succeeding (*r s*), whose entire surface is tessellated, in tolerably regular transverse rows, the tessera (C t^1 and C *t*) preserving nearly the same size and form, about 7-12 in each cross row, the intervals filled with minute, scarcely elevated, rigid hairs. In form, the third joint (*r*) is flat, elongate, dilated in the middle, rounded at the apex, and at the base turned suddenly off at right angles, forming a little cup, the convexity of which rests in the hollow of the second joint, and the concavity supports the fourth joint (*s*), which lies behind and above the prolonged part of the third joint, exceeding it in length about one-fourth part, and, like it, dilated in the middle, and a little at the base posteriorly.

The eyes (B *a*) are supported on short thick tubercles, are hemispheric and compound, the facets, ten or twelve, in the longest row, subpentagonal, amount to about seventy, certainly not less than that number, and are separated by narrow spaces, filled with dense, minute, black ciliæ.

Beneath the head presents anteriorly a rounded orifice (*b*) leading into the pharynx, the margin slightly corrugated, and on each side of it lie the inner edges of the elongate, narrow, slightly arched mandibles (*e*), which arise on each side beneath the irregular elevated edge of a horny plate (*d*), that stretches inwards from the root of the ocular peduncle; they pass inwards and forwards, and end with an extremely sharp incurved apex. Immediately behind the mandible, and from beneath the same plate, which curves a little inwards, in forming the articulating surface, is found the root of the triarticulate palpus (*f*); the first joint minute, the second large, tumid, and a little curved backwards; the apical small, cylindric, and densely covered with minute hairs.

The adjoining part of the neck (*g*) is membranous, and thrown into folds, in the motions of the head. Posterior to this part, we find the antipectus (*h*), a transverse horny plate, elevated in the middle, from behind which originate the coxa (*i*) of the forelegs. This plate, like all the succeeding, does not form a ring, encircling the trunk, but terminates at the side, where it has merely a membranous connection, with the posterior division of the prothorax, an arched plate seen from above immediately behind the ocular peduncles. Between the antipectus and the medipectus (n^1), to which on each side the coxa (*k*) of the second pair of legs is

attached, the body (*l*) is again membranous, and transversely plicated, preserving this character externally until it meets with the mesothorax, the narrow dorsal plate next in succession, and a cordiform one (*m*) placed obliquely, the apex resting in a hollow of the anterior margin of the medipectus, and the rounded anterior lobe concealing and articulated with the base of the elytron (*n*): a small interval exists between the base of the elytron and the mesothorax, which is quite membranous and plicated. The postpectus is a single shield, with a narrow dark line dividing it posteriorly into two parts.

The metathorax is as enormously developed as the prothorax and mesothorax are contracted in dimensions; it is divided into two parts by a narrow transverse plate, the anterior subpentagonal, and subdivided dorsally into four smaller parts, of which that in the middle line and farthest forward is the smallest, and five-sided; that resting against the narrow transverse plate, triangular; the lateral trapeziform, and beneath the outer angle of them the wings arise. The posterior of the two parts of the metathorax is triangular, the base in contact with the narrow transverse plate; the apex rounded, and extending over the dorsal parts of the first four abdominal rings: similarly formed plates cover the lateral portions of the first two rings.

The legs are not cylindric, varying very much in appearance according to the position from whence they are viewed; the fore-legs shortest and most slender; the coxa is short, tumid, and curved; the femur rather longer and subtriangular; the tibia elongate, clavate (*u*); the tarsus (v^{i}, v^{ii}, v^{iii}, v^{iv}) composed of four joints, of which the first (v^{i}) is longest, the remainder diminishing successively in size, all bilobed, and transversely curved, sending off from the concavity a thin transparent appendage, resembling the joint itself, but unlobed, the inferior surface having rows of strong hairs, which also crown the margins. There are no vesicles.

The elytron arises, as we have shown, from the anterior lobe of a cordiform plate, which joins the medipectus, and which is elevated and rounded to admit of the articulation. The base of the elytron is a little bulb or ball, a neck very apparent anteriorly joining it to the thin elongate ribbon-like part, which curved backwards and upwards on itself, forms the exposed part of the elytron viewed from above; the anterior edge is thickened.

The abdomen is soft, sessile, incrassate, of nine segments,

whose distinction is in some places very obscure, at the sides tolerably strongly marked: the last segment is excavated, with two segments of an anal apparatus protruding, but not capable of greater exsertion than is represented in the drawing.

Not being able in this place (Colombo in Ceylon) to determine whether the *Sphex* in which the *Xenos* was detected be previously described or not, I subjoin the following short description and provisional specific name.

SPHEX AUROCAPILLUS.

Body black, covered with golden hair, especially at the margins of the thoracic plates and of the forehead; antennæ black; wings pale brown; the posterior margin of each wing with a broad dark band; legs ferruginous; abdomen rufous, with the apex darkish.

At Rio Janeiro, the fourth segment distorted by the insertion of the pupa of *Xenos Westwoodii*.

Plate IV. fig. A. *Xenos Westwoodii*.

B. Portion of the head and anterior segments of the thorax beneath.

C. Antenna. C *t* and C t^1. Portions of ditto more highly magnified.

D. Foreleg from above. v^{iii} and v^{iv} two of the tarsal joints.

E. *Sphex aurocapillus*, and details. E *b*. Spatulate hairs.

VI. *Descriptions of two Hymenopterous Insects from Northern India.* *By* W. W. Saunders, Esq., F.L.S. &c.

[Read 7 January, 1839.]

The two insects which I am at present about to describe were collected in the northern provinces of India by Lieut. J. Campbell of the Bengal Artillery, and form part of a small collection sent by him a short time since to this country. The first is a very interesting insect allied to *Myrmica*, but from which it appears to differ in the neuration of the wings, the two-jointed pedicel to the abdomen, and in the articulations of the antennæ, and I therefore propose forming a new sub-genus for it which I shall term "*Myrmicaria*," and thus characterize.

Myrmicaria.

Head transverse, with the ocelli placed in a triangle on the vertex. *Eyes* lateral, small, oval and prominent. *Antennæ* filiform, inserted in the front of the head in a line drawn between the eyes, rather longer than the thorax, distinctly thirteen-jointed; the first joint as long as the second and third; the second very small; the fourth to the thirteenth smaller than the third, and gradually decreasing in length to the terminal joint, which is nearly as long as the third. *Mandibles* small, almost concealed. *Thorax* ovate, very convex, prominent in front. *Scutellum* semi-ovate, prominent, forming, with the metathorax, an abruptly inclined plane. The *superior wings* with the stigma strongly marked, one cubital and one discoidal cell complete, and three cells on the apical margin sub-complete; the radial, discoidal, and sub-discoidal nervures nearly reaching the apical margin. *Legs* long and slender, with the posterior tarsi elongate. *Abdomen* subcordate, petiolate; the two first joints inversely clavate and forming the petiole; the terminal or seventh joint minute, and provided with two projecting valves.

M. Brunnea. (Plate V. fig. 2.)

Shining chesnut brown, hairy; eyes black; posterior margins of the five terminal segments of the abdomen dark brown; wings lightly tinged with brown, the nervures and stigma the same colour as the body; femora and tibiæ somewhat darker.

Length $\frac{6}{10}$ inch, width $\frac{8}{10}$ inch.

From the collection of Mrs. T. Prinsep.

[Fig. 2 *a*, head seen from above; 2 *b*, antenna; 2 *c*, fore wing; 2 *d*, hind wing; 2 *e*, apex of abdomen.]

The second insect is a new species of the Fabrician Genus *Pronœus*, the description of which is as follows.

Pronœus Campbellii. (Plate V. fig. 1.)

Light reddish brown; shining eyes; ocelli and apical joints of the palpi dark brown; tips of the mandibles black; wings of a light burnt-sienna colour, with a broad dark band on the apical margins, reaching nearly to the internal angle in the under wings and gradually running to a point; nervures of the same red-brown as the body; abdomen dark chalybeous purple, very polished, the pedicel red-brown.

In the collection of Mrs. T. Prinsep, and in my own.

Length $1\frac{2}{10}$ inch, width $1\frac{8}{10}$ inch.

I have named this magnificent species after Lieut. Campbell an active Indian Entomologist.

[Fig. 1 *a*, head seen from the front; 1 *b*, antenna; 1 *c*, apex of fore wing; 1 *d*, foot.]

VII. *Descriptions of four new Dipterous Insects from Central and Northern India.* *By* W. W. Saunders, Esq., F.L.S. &c.

[Read 2 December, 1839.]

Family TABANIDÆ.

New Genus. Gastroxides.

Head transverse, with three ocelli placed in an equilateral triangle on the vertex; proboscis straight, inclined downwards, about as long as the head. *Antennæ* rather longer than the head, three-jointed—first joint cylindrical, twice as long as the second, which is longer than broad—third joint a little longer than the two first, with four distinct rings dividing the joint into five divisions, the first of which is as long as the four following, and produced at the base on the superior part into an acute spine pointing forwards—the four last divisions equal in length. *Thorax* oval, rather broader than the head. *Abdomen* seven-jointed, ovato-conical, terminating in an acute point. *Legs* long and slender.

Gastroxides ater, mihi. (Plate V. fig. 4.)

Coal black, hairy; the wings of a black-brown, with a yellowish irregularly oval spot crossing the middle of the disk, and a smaller spot of the same nature towards the apex. Expansion one inch, length $\frac{1}{2}$ inch.

From central India. In my own collection.

Obs.—This genus approaches nearest to *Tabanus*, but differs in having ocelli, in the antennæ, and in the shape of the abdomen. Its approach to other genera of the family *Tabanidæ* is also evident, but it differs from all the genera that I am acquainted with, and therefere I have made it the type of a new sub-genus under the name of *Gastroxides*, in allusion to the shape of the abdomen, which is unusual in the family to which the insect belongs.

[Fig. 4 *a*, head sideways; 4 *b*, antenna; 4 *c*, wing.]

Family ANTHRACIDÆ.

Anthrax ruficollis, mihi. (Plate V. fig. 5.)

Dull black, hairy, with a rufous margin of hairs on the anterior part of the thorax, and two large round pure white spots, one on either side of the third joint of the abdomen; wings hyaline, with the base black, and a broad black band running nearly across the middle of the disk, which on the anterior margin is produced into

a point towards the apex, and joins posteriorly with the black colouring of the base, the intervening part of the costa being also black.

Expansion 1 $\frac{6}{10}$ inch, length $\frac{7}{10}$ inch.

From central India. In my own cabinet and that of the Rev. F. W. Hope.

I am indebted to my friend J. Prinsep, Esq., Secretary to the Asiatic Society, for this beautiful *Anthrax*, as well as for the *Gastroxides* just described.

Obs.—This may be the *Anthrax collaris* of Wiedemann (Ex. Dip. vol. 1, page 271), but he gives that species as much smaller and as probably coming from the Cape. He describes the wings as "alis nigris, guttula, excisura, apiceque limpidis," which I cannot reconcile with the wings before described, and therefore I have made a new species of it.

Family SYRPHIDÆ.

Ceria eumenioides, mihi. (Plate V. fig. 6.)

Head transverse, as broad as the thorax, yellow, with the eyes black, and the antennæ and ocelli of a light reddish-brown. *Thorax* reddish-brown, with a yellow spot on either side on the anterior margin above, a yellow transverse line just before the insertion of the wings, terminated by yellow spots, below which, down the sides, is a broad vertical yellow band. *Scutellum* black, broadly margined with yellow. *Abdomen* petiolated, somewhat broader than the thorax, the petiole of a single joint; first joint very attenuated in the middle and enlarged at both ends, as long as the head and thorax, reddish-brown, margined behind and before with yellow; second joint rich dark-brown, broadly margined with yellow; third joint dusky brown, black at the base and with a yellow margin, which enlarges along the sides, and forms two large oval spots—apical joint yellowish brown.

Expansion one 1 $\frac{3}{10}$ inch, length $\frac{8}{10}$ inch.

From northern India. In a collection sent to this country by Lieut. J. Campbell of the Bengal Artillery, and now in my custody.

[Fig. 6 *a*, antennæ; 6 *b*, wing; 6 *c*. leg; 6 *d*, extremity of tarsus.]

Family MUSCIDÆ.

New Genus. Dasyneura.

Head transversely ovate, nearly as broad as the thorax, with three ocelli placed in a broadly based triangle on the vertex, and

three shallow cavities on the interior margin of the eyes, from which arise single bristles. *Antennæ* placed in front, approximating at the base, three-jointed, the two first joints inversely conical, short, the third long, declining, ovato-conical, with a plain seta arising from the base, which is rather longer than the joint. *Thorax* broadly ovate, obtuse in front, with the scutellum considerably produced. *Abdomen* subrotund, about the length of and a little broader than the thorax. *Legs* moderate. *Wings*, with the anal nervure very much incrassated.

[Fig. 3 *a*, head in front; 3 *b*, antenna; 3 *c*. foot; 3 *d*, wing.]

Dasyneura zonata, mihi. (Plate V. fig. 3.)

Reddish-brown. *Head* yellowish-brown, with the eyes darker, and having four long upright bristles on the hinder margin. *Thorax* bristly, with a spot on either side in front, two longitudinal streaks on the upper surface, a vertical band down each side just before the insertion of the wings; the *scutellum*, and another vertical streak just below the scutellum, yellow. *Abdomen* with the first segment margined with yellow, and the base of the second dark brown; the fourth segment lighter, with a dark line down the centre of the upper surface, and a dark spot on each side.

From central India. Expansion $\frac{1}{2}$ inch, length $\frac{1}{4}$ inch.

For this insect I am again indebted to my friend J. Prinsep, Esq.

Obs.—This interesting little insect does not enter into any of the present established genera of *Tephritides*, as far as I am acquainted, and I have therefore formed it into a new sub-genus under the name of *Dasyneura*, in allusion to the thick nerve at the base of the wings, a character which will at once distinguish it. This thick nerve seems to be the result of the soldering together, as it were, of two nerves, which in several genera of *Tephritides* closely approach each other, but here they are so close to each other as to form one thick broad nervure.

VIII. *Description of some new Lamellicorn Coleoptera from Northern India.* *By* the Rev. F. W. Hope, F.R.S. &c.

[Read 1 July, 1839.]

Eucirrus, *Dupont.*

Eucirrus Griffithii, Hope.

Obscurè testaceus, thorace cinereo, elytris fere glabris; sub lente forte sparsim punctulatis. Corpus pedesque albo-squamosa.

Caput fuscum, postice auratis capillis obsitum; clypeo subreflexo, subemarginato. Thorax obscurus, cinereo-squamosus, lateribus ovatis. Elytra obscurè testacea, sub lente sparsim punctulata, albis capillis e medio punctorum surgentibus. Nodus albidus pilorum, fere apicalis, in singulo positus. Anus fere trigonus cinereo-squamosus. Corpus infra fuscum, pedibus concoloribus, albo-squamosis.

Long. lin. 24, lat. lin. 12.

Habitat in Assam.

This is the largest *Melolonthideous* insect which has fallen under my notice, being two inches in length. The type of the genus is *Eucirrus Mellii*, the characters of which will be found detailed in Guérin's Magasin de Zoologie, published in 1832.

It must be remarked that the third joint of the palpi is not so long as in the typical species. Instead of forming a sub-genus, I retain Guérin's original name, as it cannot be ranged with Mr. Kirby's genera *Lepidiota* or *Holotrichia*, both of them covered with granulated scales. In the form and smoothness of its elytra, and in the prominent tubercle of white hair placed near the apex of the elytra, the above insect agrees with *Lepidiota*. I have named it in honour of Mr. Griffith, an indefatigable Botanist, who captured it with other specimens in the Assamese territories. It is, I believe, only the second species of *Eucirrus* yet described; a third, if I am not mistaken, is in the Vigorsian collection, now in the possession of the Zoological Society.

Rhomborhina, *Hope.*

Rhomb? Cantori, Hope.

Affinis *Rhomb. Hardwickii*, Hope, at latior.

Nigra, clypeo cornuto, femoribus tibiisque miniatis, anticis uni-

dentatis. Totum corpus supra atro-violaceum, subtus nigrum. Clypeus antice excavatus, postice cornutus, cornu elongato; posteriori parte capitis protenso, antice abruptè truncato. Thorax elytris latior, sub lente subtilissimè punctatus. Elytra glabra, nitida, vix striato-punctata. Corpus infra nigrum, femoribus et tibiis miniatis, tarsis geniculisque nigris.

Long. lin. 13, lat. lin. 7.

This insect I lately received from my friend Dr. Cantor. It was taken in the territories of Assam. It approaches in its characters *Trig. Hardwickii.* The clypeus has only one horn. It is considerably broader, and probably might by some be thought to be a female of the above species. It is, however, quite distinct. Many specimens are in the collection made by Mr. Griffiths.

Rh. Hyacinthina, Hope.

Corpus supra nigrum, clypeo purpurascenti; infra atrum; pectore, femoribus et tibiis violaceis seu hyacinthinis, tarsisque atro-piceis.

Clypeus violaceus, antennis piceis, lamellis externis pallidioribus. Thorax sparsim punctatus. Scutellum fere glabrum. Elytra crebrissimè punctulata. Corpus infra nigrum, nitidum; femoribus et tibiis hyacinthinis, punctatis et pilosis.

Long. lin. 13, lat. lin. 6½.

It inhabits Assam. It is difficult to describe accurately the colour of the above insect, which is a blue, evidently inclining to a purple or violet. I have consequently called it *Hyacinthina.*

The spines on the posterior tibiæ are unusually small, when compared with other species belonging to this genus.

Rh. distincta, Hope.

Affinis *R. Mellii*, at minor. Corpus supra viride, subtus concolor, segmentis abdominis postice nigricantibus, femoribus et tibiis læte viridibus tarsisque nigris. Caput viride, oculis nigris. Thorax sparsim et subtilissimè punctulatus. Scutellum glabrum, impunctatum. Elytra crebrissime punctulata. Corpus infra viride, nitidum, pectore opalino colore tincto. Femora cum tibiis læte virescentia tarsisque atris.

Long. lin. 14, lat. lin. 6½.

Habitat in Assam.

The above insect is closely allied to *R. Mellii* in size, form,

sculpture, and in colour. It differs considerably from it however, and appears to have been unknown to the continental authors.

Rhomborhina Japonica, Siebold.

Opalino-viridis, pedibus obscurè virescentibus. Totum corpus supra opalino colore tinctum, subtus concolor. Clypeus quadratus, subreflexus, antennis palpisque piceis, maxillis apice fulvo-penicillatis. Thorax punctulatus. Scutellum glabrum, nitidum. Elytra crebrissimè punctulata. Pectus infra flavo colore tinctum, quatuor segmentis basi abdominis obscurè violaceis, penultimo aurato et ultimo virescenti. Pedes supra nigro-virides, infra femoribus pallidioribus tarsisque piceis.

Long. lin. 13, lat. lin. 6.

This beautiful opaline insect was sent to me by Professor De Haan, of Leyden. It was obtained from Japan by the celebrated Siebold, and is here described, as it appears to have been unknown to the monographers of the *Cetoniadæ*.

Coryphe, *Gory*.

Cor. jucunda, Hope.

Affinis *Cetoniæ lætæ*, Fab., at major. Viridis, nitida, thorace punctato; elytris punctis nigris striatis. Clypeus antice subcornutus, viridis, sparsim punctatus; oculis nigris antennisque piceis. Totum corpus supra et infra viride, nigro punctato-striatum, segmentis abdominis antice violaceis. Femora cum tibiis fere rectis, externe unidentatis, interne fasciculatis. Tarsi nigri et picei.

Long. lin. 12, lat. lin. $5\frac{1}{2}$.

This species inhabits Assam. It is allied to *Cetonia læta* of Fabricius, but is evidently distinct. No author seems to have remarked the peculiarity of *C. læta* having curved femora and tibiæ, especially in the males. In many other points, in sculpture, &c., *C. jucunda* differs from the Fabrician species.

Cor. amœna, Hope.

Flavescens, thorace viridi, punctato; elytris flavis, punctis nigris striatis; tibiis cæruleis tarsisque nigro piceis. Clypeus subreflexus, emarginatus, cornu medio apice acuto. Thorax viridis, sparsim punctatus. Elytra flava, striato-punctata, punctis

obscurè brunneis. Corpus infra viride, numerosis punctis atris notatum; femoribus et tibiis cæruleis tarsisque nigricantibus.

Long. lin. 8, lat. lin. $3\frac{3}{4}$.

Habitat in Assam.

Described from Mr. R. Horsman Solly's collection.

CAMPSIURA, *Hope.*

Campsiura nigripennis, Hope.

Nigra, clypeo et marginibus thoracis flavis, pectore utrinque flavo-maculato, abdomine pedibusque nigris.

Clypeus flavus, angulis lateralibus postice nigris, puncto atro utrinque conspicuo.

Thorax sparsim subtilissime punctatus, flavus, macula magna media binisque aliis utrinque ad margines impositis.

Elytra nigra, nitida, substriato-punctata, apicibus vermiculatis. Anus fere transverse ovalis, niger, linea longitudinali elevata binisque tuberculis notatus.

Corpus infra nigrum, pectore flava macula utrinque posita Pedes atri.

Captured in the territories of Assam by Mr. Griffiths. Messrs Perchéron and Gory, in their monograph of *Cetoniadæ*, have classed the typical species of this genus (which was named by me *C. xanthorhina*) under the genus *Macroma* of Mr. Kirby, not aware that *Macroma* is a division of *Schizorhina*. They have also changed the specific name which I originally gave the latter insect, in describing General Hardwick's insects. The genus was named by me *Campsiura*, from the Greek.

The drawing of the typical species, which they call *C. bicolor*, in the above quoted monograph, is wretchedly bad, and does not give an idea of the insect. The description is meagre, and cannot convey to the Entomologist any thing like its real form. *Campsiura scutellata*, Fab., and *confusa*, Hope, both of them belonging to Africa, are represented in the East Indies, by *C. Xanthorhina* and *Nigripennis*. It is probable that *Macroma Javanica*, G. and P. may belong to the same genus.

MIMELA, *Kirby.*

Mimela Princeps, Hope.

Tota supra viridis, aurata, nitida, lateribus thoracis foveis notatis, femoribus et tibiis luteo-brunneis tarsisque bronzeis.

Caput clypeo viride pallidiore colore.

Thorax sparsim punctatus, lateribus utrinque puncto fere medio, fossula obliqua impressis.

Elytra nitida, punctato-striata, punctis inter strias sparsim punctulata. Pygidium glabrum, nitidum, fossula utrinque fortiter impressum.

Corpus infra nigro-viride, femoribus et tibiis luteo-brunneis tarsisque cupreo-æneis.

Long. lin. 10, lat. lin. 6.

It inhabits Siam, and is in the collection of Mr. Horsman Solly.

Mimela decipiens, Hope.

Totum corpus supra opalino-viride; subtus smaragdinum, nitidum, pedibus concoloribus. Clypeus integer, capite subtilissime punctulato. Thorax fovea utrinque impressus, marginibus lateralibus elevatis. Elytra viridia, fulvo-translucentia, lateribus undique elevatis.

Long. lin. $10\frac{1}{4}$, lat. lin. 5.

Inhabits Assam. Sent to me by Lady Jones, with other insects from that country.

Mimela Pyroscelis, Hope.

Affinis *M. splendenti*, Hope, at minor; nitida, femoribus et tibiis igne micantibus, antennis piceis tarsisque nigricantibus. Caput sparsim punctatum. Thorax nitidus, glaber, sub lente subtilissimè punctulatus. Elytra viridia, inaurata, subrugoso-punctata, sulcis versus apicem fortiter impressis. Corpus infra nigro-æneum, segmentis abdominis testaceo colore variegatis. Femora cum tibiis roseo colore nitida, tarsisque cum unguiculis nigro-piceis.

Long. lin. $6\frac{1}{2}$, lat. lin. $3\frac{1}{4}$.

Habitat in agro Assamense.

This elegant species was given to me by Dr. Cantor, who obtained it from Assam. As I have previously written a monograph on *Mimela*, and have already described two other species from the same locality, I take the opportunity of introducing another nondescript.

Mimela glabra, Hope.

Glabra, supra viridis obscura, subtus æneo-viridis aurata et nitida, pedibus virescentibus. Caput cum antennis viride, capitulo nigricanti. Thorax utrinque binis punctis impressis. Scutellum subauratum. Elytra viridia; pygidium æneo-viride, nitidum, pectus auratum punctatum griseisque capillis obsitum. Segmenta abdominis purpurascentia, transversa serie punctorum impressa. Pedes cum tarsis virescentes, femoribus et tibiis fortiter punctatis.

Long. lin. 7, lat. lin. $3\frac{1}{2}$.

This insect, at first sight, might be considered as a small specimen of *Euchlora bicolor*. On examination it turns out to be a *Mimela*. It is the only species of my acquaintance that is without the punctures, so remarkable in the genera *Mimela* and *Euchlora*. It was given to me by Dr. Cantor, who obtained it from the territory of Assam.

IX. *Notes on a Species of Stylops.* *By* G. H. K. Thwaites, *Esq.*

[Referred to in the Journal of Proceedings, 4 June, 1838.]

On the 3rd of May, 1838, one of my brothers brought me two specimens of *Andrena convexiuscula*, from both of which I obtained a *Stylops*, which circumstance induced me to make immediate search for more of these bees, and I succeeded in capturing several, almost all either containing the larva of *Stylops*, or showing evident signs of a *Stylops* having escaped from them, but none with the perfect insect. However, on May 6th, I had the good fortune to capture a *Stylops* flying; and on the Tuesday following saw at least twenty flying about in a garden at Kingsdown, near Bristol, but so high from the ground that I could capture only about half a dozen. Since that time they have become gradually more scarce, and to-day (May 12th) I have not been able to see one.

The little animals are exceedingly graceful in their flight, taking long sweeps, as if carried along by a gentle breeze, and

occasionally (which, however, I have only observed in the first I caught) hovering at a few inches distant from the ground.* When captured they are exceedingly active, running up and down the sides of the bottle in which they are confined, moving their wings and antennæ very rapidly. Their term of life seems to be very short, none of those I have captured living above five hours; and one I extracted from a bee in the afternoon, was dead the next morning.

All the stylopized bees, both ♂ and ♀, I have taken, have manifested it by having underneath the fourth (invariably) upper segment of the abdomen a protuberance, which is scale-like, when the *Stylops* is in the larva state, but which is much larger and more rounded when the *Stylops* is ready to emerge. A bee gives nourishment generally to but one *Stylops;* but I have occasionally found two, and once three! larvæ in one bee.

* Their expanse of wing and mode of flight give them a very different appearance to any other insect on the wing.

X. *Descriptions of some new Species of exotic Coleopterous Insects.* *By* J. O. Westwood, *F. L. S., &c.*

[Read 5 June, 1837.]

Section Heteromera.

Genus. Blepusa, *Westw.* (Βλέπουσα, *aspiciens.*) Plate III. fig. 3.

Genus singulare. *Cistelides* cum *Conopalpo*, &c. conjungere videtur.

Corpus oblongum, postice attenuatum, rigidum.

Caput (fig. 3 *a*) mediocre, postice in collum contractum. *Oculi* maximi, capitis partem majorem occupantes, supra fere connexi, et anticè convergentes. *Labrum* (fig. 3 *b*) transverso-quadratum, angulis anticis rotundatis, et in medio subemarginato; margine subsetoso. *Maxillæ* (fig. 3 *c*) lobis duobus, externo majori quasi articulato, apice rotundato piloso, interno tenui apice setoso. *Palpi maxillares* 4-articulati, articulis 1mo et 3tio brevibus, 2do longiori ad apicem paullo crassiori, 4to maximo transverso securiformi. *Mentum* (fig. 3 *d*) parvum urniforme, angulis lateralibus acutis. *Labium* menti fere magnitudine, lateribus rotundatis et ciliatis. *Palpi labiales* breves 3-articulati, articulo ultimo magno securiformi. *Antennæ* graciles filiformes, sub latera producta capitis, prope oculos, insertæ; articulo 1mo brevi, 2do minutissimo, 3tio reliquis parum longiori.

Thorax transversus, capite fere duplo latior, lateribus irregulariter rotundatis, margine postico in medio rotundato producto, dorso subdepresso. *Scutellum* parvum. *Elytra* oblonga, postice attenuata, basi thorace paullo latiora, costata. *Pedes* robusti, femoribus crassis, tibiæ longiores, tarsi 4 antici 5-articulati, articulis intermediis subtus membranaceo-productis, integris. *Ungues* basi subtus dilatati, dentibus 4 vel 5 armati (fig. 3 *e*).

This singular genus serves to connect in a very interesting manner some of the tribes of which Latreille has composed his division of the Heteromerous *Coleoptera* named *Stenelytra*. It agrees with some of the *Cistelidæ* in the serrated structure of the ungues, whilst the singular form of the palpi serves to show a much nearer relation with *Conopalpus*, *Nothus*, &c. It appears nearly allied to *Allecula*, and especially to *Lobopoda* of Solier. (Ann. Soc. Ent. d. France, 1835, p. 233.)

Sp. 1. *Blepusa costata*, Westw.

Nigra, nitida, thoracis margine postico punctato, elytris striato-punctatis et costatis, tarsis piceis.

Long. corp. lin. 6.

Habitat in Mexico? D. Cuming.

In Mus. Dom. Norris, M. E. S.

Caput nigrum, læve, nitidum, oculis pallidis lutescentibus; palpis, labro et antennarum articulorum apicibus piceis. Thorax lævis, nitidus, subconvexus, lineâ impressâ longitudinali, lateribus margineque postico tenue marginatis, hoc foveis duobus intra angulos posticos margineque ipso punctato. Pedes nigri, tibiarum apicibus tarsisque piceis. Elytra nigra, nitida, in singulo striæ 9 punctorum impressorum, costisque elevatis tribus (sc. inter strias 2 et 3, 4 et 5 et 6 et 7, e suturâ); striâ alterâ abbreviatâ versus scutellum.

This interesting insect is from the rich collection of T. Norris, Esq., of Redvales, Lancashire, to whom I am indebted for an opportunity of examining and describing it. He obtained it from Mr. Cuming, but is not aware of its precise locality. It is, however, most probably from Mexico, or some adjacent part of South America, from which other allied species described by M. Solier have been received.

Section Tetramera, *Latreille.*

Sub-Section Longicornes, *Latreille.*

Genus. Rhipidocerus, *Westw.* (Ῥιπὶς, *flabellum, et* κερας, *cornu.*)

Plate III. fig. 2.

Genus singulare, inter genera *Phœnicocerum* et *Polyozam*,* quasi intermedium.

Corpus oblongum, depressum.

Caput (fig. 2 *a*, e latere, 2 *b*, subtus visum) thorace minus, facie depressâ. Mandibulæ (fig. 2 *d*, 2 *c*) parvæ, corneæ, subtriangulares, interdum dente minuto ante medium armatæ, denteque altero laterali. Labrum (fig. 2 *c*) parvum, transverso-triangulare, ciliatum. Maxillæ (fig. 2 *f*) parvæ, membranaceæ; lobo interno fere obliterato, lobo externo elongato, curvato, ad apicem longe setoso. Palpi maxillares brevissimi, 4-articulati, articulis 1 et 3, 2 et 4 æqualibus. Mentum (fig. 2 *g*) parvum, transversum, antice angustatum, truncatum. Labium

* *Phœnicocerus Dejeanii*, Latr.=*Psygmatocerus Wagleri*, Perty; but the insect figured in Griffith's Animal Kingdom, under the former name, is the *Polyoza Lacordairei*, Serville.

membranaceum, emarginatum, ciliatum. Palpi labiales brevissimi, 3-articulati, articulo basali minuto. Antennæ in utroque sexu corporis longitudine, 11-articulatæ, articulo basali reliquis crassiori, 2ndo minuto, 8 proximis in mare, postice longè flabellatis, striatis, ultimo longo, flabellum terminante; in fœmina vero simplicibus, 8vo, 9no, et 10mo, antice paullo productis, (fig. 2 *h*, caput et pronotum ♀.)

Thorax transversus spinâ laterali utrinque armatus. Elytra subdepressa, sericeo-punctata, apicibus integris. Pedes mediocres, simplices.

This genus is not only interesting on account of the beautiful structure of the antennæ of the males, of which the genera *Psygmatocerus* and *Phœnicocerus*, alone* in the vast tribes of the Linnæan *Cerambyces*, offer any analogous instance, but also from the geographical situation which it occupies, being an inhabitant of New Holland, whereas the two genera above mentioned are from Brazil. In the structure of the mouth it approaches nearest to *Anacolus*. In some respects, however, it seems allied to *Lamia*, whilst the peculiar appearance of the very minutely punctured elytra most nearly resemble some of the *Cerambyces* and *Stenocori*.

Sp. 1. *Rhipidocerus Australasiæ*, Westw.

Obscurè viridis punctatissimus, luteo-subsericeus, antennis masculinis brunneis, fœmininis fulvis apicibus articulorum nigris, pedibus brunneo-fulvis, femorum apicibus obscurioribus.

Long. corp. ♂ lin. 8; ♀ lin. 15.

Habitat. in Australasiâ.

In Mus. Soc. Linn., Lond., et P. Walker, Eq. [nunc Hope.]

* Mr. Newman has recently described another longicorn genus with flabellate antennæ, also from New Holland, under the name of *Petalodes laminosus*.— Entomologist, p. 9. Still more recently (June, 1842) I have seen in the collection of M. Reich, at Paris, another flabellated species from New Holland, which may be thus concisely characterized:—

Piesarthrius? Hope, Proc. Zool. Soc. 1840, p. 55.

P. Reichii, *Westw.* P. capite et pronoto obscure fuscis, varioloso-punctatis et fulvo-pilosis; elytris piceo-rufis, maculâ magnâ discoidali communi ante medium, antice bifidâ, strigisque duabus posticis luteis; pronoto subquadrato; antennis flabellatis, articulis longitudine crescentibus; elytris apice rotundatis et ad sutura breviter aculeatis.

Long. corp. lin. 10.

Habitat Sydney, Nov. Holl.

Mus. D. Reich, Parisiis.

XI. *Observations on the* Œstridæ. *By the late* W. Sells, *Esq.*

Part I.—[Read October, 1837.]

It having appeared to me desirable to extend the observations, and to verify the facts which are detailed in Mr. Bracy Clark's valuable Essay on the Bots of Horses and other Animals, which was published in 1815, I took steps, in the spring of this year, for procuring larvæ of the *Gasterophili* from a horse-slaughterer and several horse-keepers who live in my neighbourhood; and as my applications to them have not been altogether unprofitable, I beg leave to submit to the notice of the Society these first results of my pursuit of this interesting department of Entomology.

It being of considerable importance that in all inquiries into the economy of insects, respecting which our present state of knowledge is imperfect, we should, as much as possible, give the precise dates connected with the periods of their transformations, both as useful facts in themselves, and as guides to those who are led to take up the same course of observation, I will first give a copy of the entries in my journal which have reference to this subject.

May 12, 1837.—Received a specimen of a nearly full grown larva of *Gasterophilus hæmorrhoidalis*, or red-tailed Bot fly; it was found in recently dropt dung, was active and lively, showing no little muscular power by making a considerable spring from the desk on which it was placed for the purpose of being drawn while in a living state.

May 16.—Received three dozen of apparently full grown larvæ of *Gasterophilus equi;* but it is probable they are all dead, in consequence of their close stowage in the pill-box provided for their reception (as afterwards proved to be the case): also one larva of *hæmorrhoidalis*, which had been plucked from the verge of the anal passage.

June 25.—Received three larvæ of *hæmorrhoidalis* which appear full grown, and will most likely go into pupa; the man who sent them said there were two more adhering to the horse's rectum, which he had tried carefully to pull off, but their heads were separated in the attempt, the others had dropped in the dung.

June 27.—Received a larva which I considered at the time to be one of *G. equi*, but it turned out afterwards to be *G. veterinus*, and a female.

June 29.—Received two larvæ of *hæmorrhoidalis* and one of *equi:* after this date I did not obtain any further contributions of larvæ which had traversed the intestines of the horse. The whole of them were placed in some damp mould in a garden pot, which was tied over with gauze, and on August 3rd two females of *hæmorrhoidalis* came out of pupæ, and also a beautiful female of *G. veterinus.*

August 13.—Two male flies of *hæmorrhoidalis* appeared.

August 14.—One more specimen of *hæmorrhoidalis* came out, being a very fine male, and the valvular openings of its pupa case are not detached, as generally happens with one or both of them.

As the number of larvæ which completed their transformations corresponds with that of those which were received upon, and after, the 25th of June, and which were all, except two, of *G. hæmorrhoidalis,* I conclude that those brought on May 12th and 16th, and which were nearly all presumed to be *G. equi,* might, in addition to injury from pressure, have passed prematurely from the stomach of the horse, owing to some accidentally disturbing cause; therefore, the time of these creatures quitting their seat of nurture is about the last week of June, and as they appeared in the fly state from the 3rd to the 14th August, the intervening period was about seven weeks.

The following entry appears in my journal under date of June 1:—"Received from Mr. H. two pieces of the stomach of an old horse, which he killed to-day by order of the owner, as, notwithstanding it had been turned out at pasture for some time, it was unable to perform any work." One of the portions, which is entirely of the villous structure of the stomach, contains a cluster of forty-eight larvæ of *Gast. hæmorrhoidalis,* and the other portion, which is half cuticular and the remainder villous, has six larvæ attached to the former and twenty-four upon the latter surface, in all thirty, of the larger kind of *Gast. equi;* the whole are nearly full grown and all alive, upon detaching one of them it speedily refixed itself.* The villous portions of the stomach to which the bots fixed themselves are much altered in organization, being generally thickened, somewhat inflamed, and discoloured in patches with blood, several spots are ulcerated, forming cavities

* In order to keep the parts sweet, and cleanse them from some particles of vegetable matter and a good deal of mucous, they were, in the first instance, and that immediately, put into strong salt and water for a day or two, when it was found that even this pickling had induced but very few of them to relinquish their hold.

dipping into the muscular tissue, with raised callous edges, containing a kind of lardaceous matter; at most of the points where the insect has imbedded its head and part of its body, a circular warty enlargement appears, and upon squeezing the surrounding hardened portion where a larva is deeply lodged, some of the thick white substance alluded to was forced out, but without compelling the bot to quit its hold: on the other hand, the cuticular portion which had been attacked exhibits but slight comparative injury. The preceding observations, in connexion with the physiological views which could hardly fail to present themselves, have led me to a conclusion quite at variance with the opinions of Mr. B. Clark as to the mode in which the bot is nourished, but which it may not unfairly be presumed has been long since modified by that gentleman's further consideration and enlarged experience.

The horse's stomach is a large macerating bag for the vast quantities of vegetable food of which it is the recipient, and where its digestion is but partially accomplished, that process being completed in the expanded head of the colon. Now Mr. Clark's idea of the bots feeding either upon the gross vegetable substances, or the watery juices obtained from them in union with the secretions of the stomach, (and which, when in a state to be allowed to pass out of it by the pylorus, is called chyme,) is, to my mind, entirely erroneous. The bot, when once fixed by the peculiar cross-locking of its tentacles, rarely quits its hold until full grown and ready to pass into pupa, and no doubt is mainly supported by sucking fluids from the vascular structure of the horse's stomach, and imbibing matters secreted in consequence of the wound it inflicts upon the coats of that organ, and where, as a foreign body, it proves a constant irritant; this will account for the common failure of attempts made for the removal of bots by the administration of large doses of opium, tobacco, aloes, calomel, or castor oil, as these several substances do not in that case become mixed with the proper food of the insect.

As regards the probable effects of the *Gasterophili* upon the health of the animals which they inhabit, the opinion which I shall venture to advance on this matter will tend to prove that I have not been able to take quite so favourable a view of the innocence, and, indeed, positive salubrity, of these inmates of the digestive apparatus of the horse, as we find in Mr. Clark's Essay; where, in addition to many sensible and scientific remarks, the author gives some interesting illustrations of the importance of counter-irritants, as the happily provided means of preventing

some diseases, and of retarding the progress of others; of the former, he gives us an example from Linnæas, "that the gnawings of lice in the head prevent coughs, wheezings, blindness, &c.," and of the latter he instances "the benefit derived from a copious breeding of worms in children of cachectic habits." Mr. Clark appears to include bots in the above class of remedies, and considers that they are not only not injurious in themselves, but that, through the stimulus they impart to the stomach in the discharge of its function, they prove really salutary—as the harmless substitutes for actual disease. I have no doubt that where bots are in moderate numbers, and attached to the cuticular coat of the stomach, they interfere little or nothing with the digestive process, or in any way affect the health or vigour of the horse, as, after a certain time, they take their departure, when the self-adjusting vital powers of the organ will speedily restore to a perfectly sound state the parts of it to which these parasites had so long been living appendages. On the other hand, when large quantities of them are found congregated upon the *villous* coat, especially if located near the distal or pyloric opening of the stomach, which is the most sensible and irritable part of it, and there produce such effects as have been described in a former part of this paper, it becomes impossible to consider them otherwise than injurious, and that they must, under such circumstances, impair materially the health and condition of the animal whose organ of nutrition is thus formidably attacked. Mr. H., an old veterinarian, an intelligent man and of very extensive experience in the diseases of horses, assures me that in two instances where he had opened the bodies of horses which had died from internal causes, he found the coats of the stomach perforated by bots, so that he could pass the tip of his little finger through the opening, and through which a portion of its contents had escaped into the cavity of the abdomen. Bots were present in great numbers, and must in these cases (if his statement be true) have, most undoubtedly, been the immediate cause of death; at the same time, it must be remembered, that such a fact is not in accordance with the usual processes of nature during the progress of disease affecting internal organs.

Part II.—[Read 1 October, 1838.]

With the return of the proper season this year, I resumed my attention to the economy of the *Gasterophili*, and extended my observations to the proceedings of *Œstrus bovis*, the only species of that genus respecting which I was at all likely to be successful, as all my inquiries concerning *Œstrus ovis*, among intelligent butchers, were answered by saying that since the very general preference of the breed of polled sheep, the maggot formerly found internally near the origin of the horn had become very uncommon.

The Entomological campaign of the current year, as respects the insects under consideration, having now nearly terminated, I beg leave to submit such results of the same, in that department, as are in my hands, to the notice of the Society.

As regards the *Gasterophili*, between the middle of May and the end of July, I received many specimens of *Hæmorrhoidalis*, which made their appearance in the fly state at corresponding dates up to the end of August. These larvæ were chiefly removed by the finger of the collectors from the verge of the anus of the horse, and may thus be easily obtained, while those of *G. equi* are far more difficult to procure, as they drop with the dung, and are frequently picked up by poultry. I received one specimen of the latter as late as August 8th, which buried itself in the mould nearly two inches, but not having come out has most likely perished.

On August 27th a fine specimen of *G. salutiferus* (var. β Clk.) came forth, but owing to the vessel which contained it being incautiously exposed to a powerful sun before the wings were quite dry, the insect, being very vigorous and active, damaged them considerably during my absence from home.

I will now give my observations upon *Œstrus bovis* in a condensed form, according to the order in which they appear in my journal.

May 4.—Early in this month I commenced my walks among the farms in my neighbourhood, and visited several dairy establishments, and lost no time in selecting the more promising cases for practising the method recommended by the able author of the Essay on Bots, for the capture of the full grown larva. I had the œstral tumours, at various periods, on several cows, carefully shaved and dressed in the most approved Clarkyan mode, but, although the operation was performed "secundum artem" with great care, and the plaster

was powerfully adhesive, it did not, in any instance, prove successful; owing, chiefly, to the cows being turned out at night, when, from some disturbing cause or other, the plastered leather became gradually detached, and I failed to *bag* my game in the little muslin pouch provided for its reception. Having foreseen that the chances of failure in this way were very great, and as it was evident that the vulgar mode of squeezing or popping out the larva through the small opening in the hide, by which the insect obtains air for respiration, must prove fatal to it, I determined to enlarge the orifice very freely by means of a director and probe-pointed bistoury, and then pressing the sides of the sac firmly and carefully the safe delivery of the insect was easily effected: by this plan I have been fortunate enough to obtain, as will appear in the sequel, seven specimens of the fly.

May 11.—The larvæ removed to-day were most of them of premature growth, being of a beautiful pearly white, and others of a very pale tawny colour with darker patches.

May 24.—Several specimens of full growth were removed during the last fortnight, and I noticed for the first time, the collapsed state of the swellings from which the insects had taken their departure.

June 7.—The preceding two weeks have procured me many specimens, some quite white and others dark tawny.

July 23.—Continued procuring larvæ up to this day; with the exception of a few remaining in two or three cows, they have all quitted their snug warm quarters in the midst of plenty, to hazard the many casualties of a new state of existence. The greatest number I noticed in any one animal was about 100; they were in a heifer which had been much turned out; I succeeded but in one instance to obtain a specimen, which had come out spontaneously; the larvæ were placed on fine mould, kept slightly damp, in a garden flower-pot, and covered with gauze, the perfect insects appeared at the following dates:—

July 10.—A male, the shell from which it came forth contained a good sized drop of a limpid, brownish, purulent fluid.

July 16.—A very fine male.

July 25.—A female.

August 2.—A female.

August 20.—A female, the larva of which having been put aside by itself on July 11 proves the intermediate stage to have been exactly forty days.

August 27.—A fine male.

And same day raised the operculum of another, and found the imago perfect, and shrouded within a very delicate thin membranous pellicle, interposed between itself and the inside of the strong shell which is formed by the desiccation and hardening of the thick cutis of the larva.

The resemblance of the front or face of the head of *Œstrus bovis*, particularly in the female, to the countenance of the monkey tribe, is very curious and striking; the short setaceous antennæ proceed from two hemispherical naked shining bodies, whose lighter colour in the circumference, and darker hue in the middle, completely simulate a pair of eyes, placed in hollows not unlike sockets; immediately below these prominences the face is denuded of hair, and has the appearance of a monkey's skin; then there is a naked ridge which rises in the medial line proportionally higher than the upper part of the nose in the monkey; all the lower part of the face is very hairy.

The telescopic structure of the ovipositor in the female was beautifully distinct, especially in a recent state; it consists of two highly polished cylindrical joints, of an osseous structure, connected one with the other, and the larger to the apex of the abdomen by a strong ligamentous tissue: at the aperture of the tube there protruded a soft papilla, being the termination of the muscular and membranous apparatus enclosed within the horny tube, and through which the ova pass securely to the destined place of deposit, which is doubtless, by the infliction of a wound, in the skin of the animal.

My specimens confirm the correctness of Dr. Leach's conjecture that the insect he took on the heath near Plymouth, and first named *Œstrus cricetorum*, is, as he afterwards believed it to be, the male of *Œstrus bovis*.

XII. *On several Species of* Bolboceras, *Kirby, from New Holland, in the Collection of the* Rev. F. W. Hope, F.R.S., &c. *By the late* Mr. William Bainbridge, *Assistant Curator to the Entomological Society of London.*

[Read 3 June, 1839.]

M. le Comte Laporte de Castelnau, in the third volume of the "Histoire Naturelle des Animaux Articulés," makes mention of about twenty species of *Bolboceras*, a genus of lamellicorn beetles allied to *Geotrupes*. It is remarkable that only one of them is described as occurring in New Holland, namely the *Bolboceras Australasiæ*. Observing in the collection of the Rev. F. W. Hope several new, large, and singular species, I solicited his permission to describe them, and now offer them to the Entomological Society of London.

Sp. 1. *Bolboceras Kirbii*, Bainbridge.

Testaceus, thorace nigricante, punctatissimo seu varioloso-punctulato, antice fortiter retuso, capite obtuse carinato ♂.

Long. corp. lin. 10½, lat. lin. 6.

Corpus subrotundatum, totum supra testaceum, subtus pubescens. Caput medio cornutum, apice inciso, antice truncatum, angulis externis fortiter interne incisis; margine inflexo. Thorax antice retusus, postice rotundatus et punctulatus. Elytra striato-punctata. Corpus subtus concolor, pubescens; tibiæ anticæ dentatæ, ultimo minuto, serraturis nigris; calcaria tibiarum longissima.

This species was received from Melville Island.

I add to the short Latin description a more detailed one in English.

Entirely of a castaneous brown, the head and punctulated part of the thorax and scutellum of a darker colour. Head elongate-quadrate, in the middle is an elevated carina, with the anterior angles circularly recurved, and descending to the margin; from whence arises another keel, ascending higher than the first, with the apex furcate, the intermediate spaces being closely rugulose-punctate. Thorax convex, very broad behind, anteriorly truncate, roughly punctate in the middle, and very glossy in front, with two circular perforations near the anterior margin; in the

centre is a deep, broad, coarsely punctate channel, with a smooth shining space on each side, the hinder part smooth and shining, with a line of punctures along the posterior margin. Elytra convex, glabrous, punctato-striate, shoulders elevated. Body beneath paler than above, and beset with tawny hairs.

The female of this species is shorter and more convex than the male, in other points they are very much alike.

Sp. 2. *B. latus*, Bainbridge.

Castaneus, thorace punctatissimo, antice retuso, capite externe denticulato.

Long. lin. 9, lat. lin. $5\frac{1}{2}$.

Corpus rotundatum, totum supra castaneum, subtus pubescens. Clypeus irregulariter truncatus, medio incisus. Caput lateribus utrinque denticulatis. Thorax sparsim punctulatus, antice lineâ transversâ elevatâ irregulari notatâ, marginibus serratis. Elytra striato-punctata. Corpus subtus pubescens, rufo-testaceum, capitulo antennarum flavo.

This species was received from Captain Roe, of the New Settlement of Swan River in Australia.

Entirely of a castaneous brown colour. Clypeus and head closely punctured, the latter with an undulated carina, with the ends produced into short horns; a luniform impression behind. Thorax broad, retuse, and very much punctate in the front; with an undulated carina and two punctate impressions at the posterior angles: smooth and glossy at the base. Scutellum convex, smooth. Elytra punctato-striate. Legs and body beneath pale castaneous, beset with tawny hairs.

This species appears to be a female, the male of which is not known.

Sp. 3. *B. serricollis*, Bainbridge ♂.

Castaneus, capite antice dentato; thorace antice retuso, bicornuto, nigro.

Long. lin. $8\frac{1}{2}$, lat. lin. 5.

Totum corpus supra castaneum, infra piceum. Clypeus lunæformis, angulis externis antice subcornutis. Thorax antice retusus, in medio prominentia elevata insignis, lateribus externis serratis, sparsim punctulatis. Elytra striato-punc-

tata. Corpus subtus rubro-piceum, pubescens; femoribus pallidioribus.

Received from Captain Roe, from the Swan River.

Castaneous brown. Head elongate, quadrate, with two lunulated horns, and a lunate impression behind. Thorax very broad, punctate in the middle, with an elevated carina having an angular notch in the centre, and a very large and deep fovea near each anterior angle, very glossy at the base. Elytra punctate-striate, shoulders prominent. Body beneath dark castaneous, beset with tawny hairs. Anterior tibiæ with five teeth.

The female of this species is very like the male, but is smaller, and the thorax more truncate anteriorly, which is generally the case with the females of this genus. The fovea at the anterior angles of the thorax, so remarkable in the male, are much less distinct in this sex.

Sp. 4. *B. hastifer*, Bainbridge.

Piceus, thorace retuso cornuto, elytris nigricantibus; corpore subtus flavo et tomentoso.

Long. lin. 8, lat. lin. 4½.

Clypeus antice emarginatus, capite in medio cornu suberecto; binis dentibus utrinque armatus, postice lævis. Thorax antice retusus, postice carinatus, cornu erecto e medio disci thoracis surgente, apice incrassato. Elytra striato-punctata, nigricantia. Corpus infra flavum, tomentosum; oculis atris nitidis; tibiis anticis sex-dentatis, serraturis nigris.

This insect was sent to England by Captain Roe, from the Swan River in New Holland.

Head and thorax castaneous brown. Clypeus broad emarginate. Head smooth behind, punctate in front, with a short horn at the apex, and two elevated tubercles on each side near the eyes. Thorax broad, sparingly punctate, with an upright horn in the centre with the apex dilated, and surrounded by a nearly semicircular carina, behind the horn is a deep fovea; the scutellum is punctate, the disc smooth. Elytra dark brown, deeply punctate-striate; body beneath and legs pale castaneous, clothed with coarse hairs. Anterior tibiæ with six teeth.

Sp. 5. *B. 7-tuberculatus*, Bainbridge.

Totum corpus supra castaneum, infra testaceum et tomentosum, capite tuberculato.

Long. lin. 8, lat. lin. 4½.

Clypeus emarginatus, capite 5-tuberculato seu dentibus quinque armato, dente antico robusto, quatuor aliis fere æqualibus, binis lateralibus minutis. Thorax retusus, in medio fovea fortiter impressus. Elytra striato-punctata. Corpus infra flavum et tomentosum; tibiis anticis 6-dentatis, serraturis nigris.

This insect is also from the Swan River, New Holland.

Castaneous brown. Clypeus with five elevated tubercles, four at the base and one at the apex. Thorax punctate, with a nearly semicircular carina, and a large, deep, smooth fovea in the front, also with a short tubercle in the centre. Scutellum punctate, depressed and anteriorly rugose. Elytra shining, punctate-striate. Body beneath, and legs, pale castaneous, and clothed with coarse hairs. Anterior tibiæ armed with six teeth.

Sp. 6. *B. fissicornis*, Bainbridge.

Castaneus, capite quinque-dentato, thorace cornuto medio inciso, corpore subtus flavescenti tomentoso.

Long. lin. 7, lat. lin. 4.

Clypeus subemarginatus, quinque dentibus armatus, dente antico majori robusto, apice nigro; binis aliis utrinque minoribus. Thorax retusus, medio cornutus, apice fortiter inciso, seu melius dentibus binis armatus. Elytra striato-punctata, nigricantia, humeris pallidioribus. Corpus infra flavum, valdè tomentosum, femoribus testaceis; oculisque atris et nitidis.

From the Swan River Settlement.

Castaneus brown. Clypeus punctate, with a short horn at the apex, and two tubercles on each side at the base. Head smooth and glossy. Thorax very short, shining, punctate, with a bifid horn in front, behind which is a deep fovea surrounded by a semicircular carina. Elytra pitchy brown, punctate-striate, with the scutellum, suture, and basal angles, of a paler colour. Body beneath pale castaneous, and clothed with yellow hairs. Anterior tibiæ with six teeth.

Sp. 7. *B. tritubercularis*, Bainbridge.

Castaneus, capite quinque-dentato, thorace subretuso tritubercularis.

Long. lin. 7, lat. lin. 4½.

Corpus subtus flavo-tomentosum. Clypeus quadridentatus, medio

emarginatus. Caput quinque-denticulatum, dentibus fere æqualibus. Thorax subretusus, medio ternis tuberculis armatus, interno minori. Elytra striato-punctata, corpus infra flavum et valdè tomentosum.

From the Swan River.

Castaneous brown. Clypeus quadridentate. Head punctate in front, smooth behind, with five nearly equal tubercles. Thorax very shining, sparingly punctate, with three horns in the centre, the middle one shortest, the lateral ones recurved, behind there is an oblique glossy space, encircled with an irregular carina. Scutellum glossy, punctate. Elytra pitchy brown, punctate-striate. Anterior tibiæ with five teeth.

Mr. Kirby's species, *B. Australasiæ*, described in the Transactions of the Linnæan Society (Vol. XII.), is a female, and from its pale chesnut colour I should consider it as immature. The male does not appear to be known.

Note.—M. Guérin Meneville has published the descriptions of two species of this genus, from Swan River, in the Magasin de Zoologie. (Insectes du Voyage de la Favorite, p. 50, 51.)—Sec. E. S.

XIII. *Description of some Hemipterous Insects of the Section* Heteroptera. *By* Adam White, Esq., M.E.S. Assistant in the Zoological Department of the British Museum.

[Read 3 December, 1838.]

Fam. SCUTELLERIDÆ, *Leach*. Scutati p. Burm.

Augocoris olivaceus.

A. nitidissimus, fusco-olivaceus, maculis septem cærulescenti-nigris thorace antice, scutello maculâ magnâ basali, miniaceis.

Hab. in America meridionali (Buenos Ayres).

I am indebted to Edward Newman, Esq. F.L.S. for an opportunity of describing this fine species, as well as *Callidea bifasciata*, noticed below.

The next species I shall describe is the

Tectocoris (*Pœcilochroma**) *Childreni*. White, in Charlesworth's Mag. of Nat. Hist. Nov. 1839, p. 542. (Plate VII. fig. 1).

T. lutco-fulvus; thorace antice maculisque 4, *scutello maculis* 11, *atris; subtus nigrescenti-purpureus; pedibus viridibus.*

Long. $8\frac{1}{2}$ lin., lat. tho. $5\frac{1}{4}$ lin.

Hab. in Nepaliâ. In Mus. Brit.

Head (including eyes, antennæ and beak) black, distinctly margined, ocelli yellow. Thorax yellowish fulvous, in front black, the black colour extending in a narrow line along the slightly raised lateral margin; with four transverse black spots, the two dorsal ones larger and rather square. Legs green. Scutellum obtuse, of same colour as thorax, with eleven black spots, three at the base, the central one triangular and largest, two behind these, four in the middle (the two inner largest), and two near the tip. Hemelytra black, somewhat shining. Body beneath purplish black, sides of abdomen with four transverse yellow lines, sometimes confluent at the base and forming a yellow patch, end of abdomen green.

Note.—The scutellum in front of the third range of spots is depressed, but whether this be constant or accidental cannot be determined.

* I would suggest the separation of this division from the group containing *cyanipes* and *Banksii*, retaining Hahn's name, *Tectocoris*, for the latter, and giving the name of *Pœcilochroma* to the genus of which *Cimex Druræi* was the first described species.

It is of the same form as *T. Drurœi* (L.) *Hardwickii, affinis*, &c. of Hope, which differ from *T. Banksii* and *cyanipes*, in having the head shorter and squarer in front, the joints of antennæ are also broader and more compressed; by H. Schæffer it would be regarded as a *Pachycoris*. Named in honour of John George Children, Esq. F.R.S. &c., late president of this society, to whom I am indebted for innumerable acts of kindness.

Callidea (*Calliphara* Germ.) *bifasciata.*

C. luteo-aurantiaca, antennis, capite, thoracis fasciâ posticâ transversâ, scutelli maculâ dorsali, fasciâque subapicali transversâ tibiisque cærulescenti-viridibus.

Long. lin. 7. (?)

Hab. in Insulâ Maris Pacifici. Dom. D. Wheeler. In Mus. Dom. Eduardi Newman.

Callidea (*Calliphara*) *parentum*, White, l. c. p. 542.

C. supra ochracea, maculis 12 *nigris; pectore, abdominis maculis lateralibus, pedibusque nitidis, nigro-violaceis.*

Long. lin. $8\frac{3}{4}$, lat. thor. lin. $4\frac{1}{2}$.

Hab. in Australasiâ? In Mus. Brit.

Head dark shining violet, with two rather long triangular red marks in front of the eyes; ocelli reddish (antennæ wanting in the Museum specimen). Thorax unarmed, dark ochraceous, with two dorsal black spots, having each a small black one in front and towards the side. Legs deep shining purple. Scutellum ochraceous, the edges tile red; with eight black spots, five at base, two behind the middle, and one near the tip. Breast dark shining violet, posterior margin of prothorax beneath red, abdomen red, at the end green, sides with dark shining violet spots. Of the same elongated form as *C. dispar*.

Note.—It would perhaps be advisable to change the name of this genus, which comes too near *Callidium*, not only in sound, but in signification. Hahn's name, *Chrysocoris*, might perhaps be used.

Callidea examinans. (*Scutellera examinans*, Burchell MSS.)

C. thorace scutelloque testaceo-purpurascentibus, lineâ dorsali, maculisque utrinque 6, *hoc insuper lineâ tenui laterali, apiceque cærulescenti-nigris.*

Long. lin. $5-6\frac{1}{4}$.

Hab. in Africâ austr. (Dom. Burchell). In Mus. Brit.

Of the same form as *C. 12-punctata*, from which it may be at once known by the slender black margin of the scutellum.

In some specimens the head is entirely of a blueish black, the basal joints of antennæ testaceous, the beak is black, at base red. In some specimens the three lateral spots on each side of the dorsal thoracic line are confluent, and in one small sized specimen (a ♂ ?) the spots and dorsal line are connected in front. Thorax beneath cobalt blue, lateral margin (above and beneath) and middle red. Femora red and ciliated, as are the blueish black tibiæ and tarsi. Body beneath testaceous.

Callidea fascialis.

C. punctatissima (*læviuscula*) *lutea, maculis fasciâque scutelli transversâ, nigris; abdominis lateribus subtus coccineo-tinctis ac viridi-maculatis.*

Long. lin. 5.

Hab. in Ind. Orient.? In Mus. Brit.

Head short, in front rather blunt, with a large pinkish violet spot on the side of the two impressed præocular lines, the space between these being green. Antennæ, first joint, testaceous at base, green at tip. Beak reaches to base of hind legs, black at tip, at base yellow. Thorax with seven black spots; two distant anterior ones in front connected by a narrow slightly curved black line; five posterior ones, the central largest and square, apparently connected together at base by an obscure band, which has a slight pinkish hue on the posterior blunt angle of the thorax. Legs yellow, femora at tip blueish green, tibiæ rufescent ciliated. Scutellum convex, posteriorly bent down, blunt at apex, with a semicircular impression at base, deepest on the back; at base there is a narrow transverse black band, sinuated on the posterior margin; a little before the middle there is another transverse black band, broadest in the centre, beyond which are three spots, one of them subapical. Abdomen beneath yellow, sides tinged with pink, each segment being marked laterally with a black spot, the inner sides of which are tinged with green.

Callidea Morgani, White, in Charlesw. Mag. u. s., p. 542.

C. pilosiuscula; cærulescenti-viridis; thorace maculis 6, *scutello* 7, *lineâque abbreviatâ dorsali, atris; subtus cærulea, plagâ mediâ lutea.*

Long. lin. 9, lat. thor. lin. 4.

Hab. in Afric. trop. (Fantee, Sierra Leone), in Mus. Brit.

Head blueish green, throat yellow, ocelli rufous, having a small spot in front black, as is the space between the impressed lines on crown of head. Beak and antennæ black. Thorax in front with a slight transverse groove, blueish green, with six black spots, the posterior three largest; there is also a small one on the obtuse posterior angle. Legs blueish green, femora, except at tips, coxæ and trochanters orange. Wings black, hemelytra shining. Scutellum golden green, with seven black spots, (2, 2, 2, 1,) and a black dorsal line extending longitudinally from the base to beyond the second pair of spots. Abdomen beneath blue, with a large yellow space in middle, sides with two ranges of black spots, the inner ones largest, penultimate segment beneath green, with a large three-lobed mark at base. Two specimens of this species, along with a large and fine collection of Sierra Leone insects, were presented to the British Museum by the Rev. D. F. Morgan, to whom this beautiful species is dedicated.

Note on the genus Peltophora.

In 1826, I believe, M. Guérin published, in the Entomological part of the "Voyage de la Coquille" (Insectes, Pl. XI. fig. 7), a figure of one of the *Scutelleridæ*, remarkable for its antennæ having an elongated and slightly curved second joint, the third being minute and punctiform; he named it *Scutiphora rubro-maculata*. In 1828, the Rev. Wm. Kirby, in the third volume of his joint-work with Mr. Spence (p. 516), apparently alludes to this species, when he refers to a *Scutellera* from New Holland, in which the second joint of the antennæ "is nearly as long as all the rest of the joints taken together;" from this circumstance he gives it the name of *Sc. pedicellata*. M. Laporte, in his "Essai," &c., published in the volume of Guérin's Magasin de Zoologie for 1832, characterizes Guérin's genus *Scutiphora* (p. 71), adding, that one species only is known, a native of New Guinea. Dr. Burmeister, in the second volume of his Handbuch, published in 1835, perhaps not improperly alters *Scutiphora* to *Peltophora*, and tells us, that the third joint of the antennæ is one-third or one-twelfth shorter than the second. He describes two species from New Holland, existing in the Berlin collection, the last described of which is also found in New Guinea: the first he characterizes as having the third joint of the antennæ eleven times less than the second—this is the *Pelt. rubromaculata* figured by Guérin, as mentioned above; the second species is described as having the third joint of the antennæ three times less than the second. This latter species of Burmeister,

from analogy and examination of many specimens, I believe to be the female of the other. Dr. Burmeister, on the authority of a letter, quotes the *Scutellera corallifera* of Macleay as synonymous with the *rubro-maculata*. In the Appendix to King's Voyage, vol. ii. p. 466, this species is described; and if not the same as the *Scutellera dux*, Kirby (Linn. Trans. xii. p. 474), and *Sc. basalis*, G. R. Gray, (Griff. A. K. Ins. ii. p. 233, pl. 92), it is a very closely allied species. Had Dr. Burmeister ever seen Mr. Macleay's description, he would not have been led into this misapplication of the synonyme.

Coleotichus, White, in Mag. Nat. Hist. u. s. p. 541.

Tetyra costata of Fabricius seems to me to have characters entitling it to the rank of a genus, which might be placed between *Tetyra* as restricted by Burmeister (*Eurygaster*, Laporte) and *Pachychoris*, to a species of which it has a considerable degree of resemblance. If no name has been previously assigned it, I would suggest that of *Coleotichus*. Its characters are as follows:

Head somewhat square, in front triangular, eyes prominent. Beak four-jointed, reaching to base of hind pair of legs, joints nearly of equal length, the second the most slender, received in a sternal groove, the walls of which project between first pair of legs, behind which they gradually diminish in height, increasing in thickness as they approach the second pair, beyond this they are very broad, and in front surround the trochanter of hind pair of legs. (Pl. VII. fig. 2.) Antennæ rather short (situated on underside of head about midway between eye and beak, the base concealed from view by the projecting flap of underside of prothorax), five-jointed, first, third and fifth nearly equal in length, second shortest, and fourth rather the longest, all the joints cylindrical. Thorax nearly as long as broad, much rounded posteriorly. Scutellum as long as abdomen (which it entirely covers), with a slightly raised dorsal line. Body above depressed, beneath considerably flattened.

Coleotichus costatus was first described from a specimen in the Banksian Cabinet, and is still preserved there. Donovan figured this specimen, but his figure is bad. This species does not seem to be common in collections, and is apparently unknown on the continent.* The British Museum collection contains two mutilated individuals from New Holland.

* I have just seen Germar's Monograph of the *Scutelleridæ*, published in his "Zeitschrift für die Entomologie;" he arranges this insect in the genus *Tetyra*, as restricted by some authors, but he has evidently not seen the species, as his

The next species to be described comes near the beautiful *Scutellera lineata*, by far the most beautiful of all the European *Scutelleridæ*. It may be characterized as follows.

Scutellera (*Trigonosoma*, Burm.) *interrupta*,
Gaphosoma interruptum, White, l. c., p. 541.

S. nigra, thorace lineis tribus, dorsali solum elongatâ, partisque posterioris arcubus ochraceis; scutello lineis tribus margineque tenui ochraceis, capite acuminato.

Long. lin. $6\frac{1}{4}$.

Hab. in Ins. Teneriffe. In Mus. Brit.

This differs from the *Sc. lineata* in having a more pointed head, with a dorsal red line; and instead of the thorax having, as in that species, five distinct and continuous longitudinal lines, it has only three, an elongated dorsal, and two abbreviated yellowish red ones, reaching from the anterior margin to beyond the middle. On each side near the posterior angle of thorax is an incurved elongated spot, the anterior lateral margin slightly, and the posterior more broadly, edged with yellowish red as in *lineata*. The scutellum has three red lines, the central one not reaching the apex, the lateral ones gradually diminish in thickness as they approach the middle, where they become very obscure, but at length dilate on the margin, and reach almost to the apex; the side of scutellum is slightly margined with the same colour. The upper projecting part of abdomen is black, and not spotted with red as in *lineata*; the sides beneath are also very obscurely spotted with black. Legs yellow, with a black ring in front of the apex of femora. Note.—The yellowish red colour may in life be as bright as in the corresponding *Sc. lineata* and *semipunctata*. (Since this paper was read I have described another allied species, brought from Persia by Sir John Mc Neill, under the name of *S.* (*G.*) *Wilsoni*, Mag. of Nat. Hist., Nov. 1839, p. 540.)

The Rev. Mr. Hope's *Podops spinifera* seems to be synonymous with the *Tetyra spinosa* of Fabricius, who described it twice under different names, in the Supplement to his Ent. Syst.

M. Laporte's generic name *Oxynotus* has been pre-occupied by Mr. Swainson in Ornithology, and must consequently be altered; Cyrtocoris might not improperly be applied to it.

description is merely a translation of that of Fabricius. In my opinion it comes close to the genus *Solenosthedium* of Spinola (Essai, &c. p. 360; 1837), with which *Cœloglossa* of Germar (Zeitsch. &c. p. 130; 1839) is synonymous. (1840.)

The *Plataspis punctatus* of Westwood, *Canopus punctatus* of Leach, described and figured by Mr. G. R. Gray in Griffith's Animal Kingdom, was first described by the late Dr. Leach, in the Appendix to Bowdich's Travels. (In "The Entomologist" for July, 1841, I described a species sent from W. Africa by the late Mr. Ridley, under the name of *P. Bucephalus;* from an oversight of my own, the subgeneric name of Ceratocoris was omitted, which I now apply to it, the type being *C. Bucephalus* (Entomologist, p. 136), in the Museum Collection. July, 1842.)

Coriplatus, White.

The next insect described seems to me to belong to a genus distinct from any yet characterized, though possibly it might be placed by some authors in *Sciocoris*, by others in *Empicoris*, *Dinidor*, or *Dryptocephalus*. I propose for it the generic name above mentioned.

Head very flat, oblong, in front emarginate, eyes slightly pedunculated, having a spine in front, ocelli distant. Beak long, second joint longest. Antennæ five-jointed, situated on the underside of head, close to the margin at the base of the spine joints nearly equal in length, first thickest. Thorax broader than long, highest behind, on the forepart in the middle rounded for reception of head, lateral margin with three lobes, the central thickest and rounded at tip, the other two sharp. Scutellum nearly if not as long as abdomen, not covering hemelytra, at base broad, lateral margins angulato-sinuate, rounded at tip, membranaceous part of hemelytra apparently with six somewhat forked veins. Abdomen serrated, scarcely broader than hemelytra, much depressed. I only know of one species from South America, which I call

C. depressus. (Plate VII. fig. 3.)

C. flavus, nigro-punctatus, antennis pedibusque nigro-variis.

Long. lin. $5\frac{3}{4}$.

Hab. in Demerarâ. In Mus. Brit.

Yellow, with many impressed black dots, in some places grouped together, giving the insect a greyish appearance. Antennæ annulated and spotted with black, legs spotted with black, femora at base beneath yellow.

Dryptocephalus? (Cephaloplatus,) Pertyi.

D. punctatissimus, ferrugineo-luteus, capite bilobo, hemelytrorum parte membranaeeâ, venis maculisque nigris.

Long. lin. $5\frac{1}{4}$.

Hab. in Brasiliâ. In Mus. Brit.

This differs from the *Dryptocephalæ Brullei* (*Storthia livida Perty*), *asperula* and *cydnoides* (*Storthia*) *Perty*, in having the head only two-lobed; the eyes are much larger than in *D. Brullei*. I have given it the subgeneric name of Cephaloplatus.

A mutilated insect, from the Congo expedition, in some respects coming near the description of the *Æliæ lanccolata* and *hastata* of Fabr, and *Megarhynchus acanthurus* Hope, has the long rostrum of *Atelocera*, but, instead of an oblong second joint to the antennæ, has it cylindrical. I describe it under the name of

Ælia? gracilis.

A. punctatissima, pallidè virescens, capitis margine, thoracis parte anticâ lineâque submarginali abbreviatâ nigris.

Long. lin. 7, lat. $2\frac{1}{6}$.

Hab. Congo. In Mus. Brit.

Head much acuminated, indistinctly cloven for nearly half its length, beak pale green, four-jointed, reaching to base of hind pair of legs, second joint longest, the fourth black, antennæ (mutilated). Thorax widest behind, in front with two abbreviated submarginal black lines, and a small smooth space on each side of them, having a black spot on the inner angle. Scutellum somewhat pointed, half the length of abdomen. Hemelytra (membranaceous part) with seven rather straight veins, and indistinct ones between them. Abdomen somewhat serrated on the margin, gradually narrowing towards the tip, palest beneath in the middle and on the margin, which has also five black spots. Legs pale yellow, the tibiæ slightly ciliated.

Ælia (*Megarhynchus*, Laporte) *cænosa.*

Æl. sordidè brunnea, scutello subtusque pallidioribus, capite fisso, acuminato, thoracis parte posticâ in spinam validam porrectâ; antennarum apicibus fulvis.

Long. lin. 8-$8\frac{1}{2}$.

Hab. Gambia. In Mus. Brit.

Head cloven, black. Antennæ black, five-jointed, first short, second, third and fourth nearly equal, fifth rather longer, fulvous at tip. Thorax in front slightly serrated, punctato-rugose beneath, with an interrupted lateral palish line. Scutellum rounded at end, pale brown, with three longitudinal rows of unequal elevated points. Membranaceous part of hemelytra with black spots on the sides of the seven rather straight nerves.

This insect is not uncommon in collections from the Gambia, and may prove a dark coloured variety of *Megarhynchus marginellus*, Hope.

Spartocerus ? erythromelas.

S. pilosiusculus, aterrimus, thoracis lunulâ, hemelytrorum basi, maculâque mediâ, miniaceis.

Long. $10\frac{3}{4}$ lin., lat. thor. $4\frac{1}{2}$ lin., abd. $5\frac{1}{2}$.

Hab. Brasilia. In Mus. Brit.

Beak reaches to base of hind legs. Head cloven, black, cheeks and line over eye red, beak and antennæ black, ocelli rather distant, clear. Thorax black, with a semicircular red line, exteriorly notched behind, beneath red, with a broad black band in centre, reaching the sides in front. Scutellum small, black. Hemelytra black, base of coriaceous part, as well as a spot near the internal margin, red. Sides of abdomen projecting above, red spotted with black.

Spartocerus dorsalis.

S. ochraceo-ruber, antennis, thoracis maculâ, scutello, hemelytrorum parte membranaceâ, pedibusque nigris.

Long. lin. 8-10.

Hab. Mexico. Dom Taylor. In Mus. Brit.

Derepteryx, White, Mag. Nat. Hist. Nov. 1839, p. 542.

The genus *Cerbus* of Hahn, appearing susceptible of division, one of its sections may be characterized under the above name, as follows:—Abdomen in both sexes extending beyond hemelytra, the posterior part of thorax very much dilated, the dilated portion extending forwards beyond head, first joint of the antennæ longest, second rather longer than third, and the fourth, which is slightly curved, being rather shorter than third. Beak reaches beyond base of first pair of legs. Hemelytra with four principal veins, which are much forked. Tarsi three-jointed, first joint strong, longer than second and third put together, hairy, under side densely clothed with short hair.

Cerbus (*Derepteryx*) *Grayii.* (Plate VII. fig. 4.)

C. (*D.*) *fuscus, thorace supra verrucoso, marginibus serratis, tibiis omnibus compressis membranaceis.* ♂ *femoribus valdè incrassatis, subtus spinosis, tibiis posticis ad apicem interne dente valido instructis.*

♀ *femoribus paulo incrassatis, tibiis posticis basi lobo rotundato.*

Long. lin. $13\frac{1}{4}$, lat. thor. lin. 7.

Hab. in Nepaliâ. In Mus. Brit. Named after J. E. Gray, Esq. F.R.S. Keeper of the Zoological Collections of the British Museum.

Cerbus (*Dercpteryx*) *Hardwickii.*

C. (*D.*) *thorace serrato, dorso satis lævi, transverseque rugoso, tibiis* (*in femina saltem*) *simplicibus.*

Long. lin. 12, lat. thor. lin. $6\frac{3}{4}$.

Hab. in Nepaliâ. In Mus. Brit.

This handsome insect is dedicated to the late indefatigable General Hardwicke, who bequeathed his valuable collection of Natural History and Drawings to the British Museum.*

In both species there is a compound tooth at the apex of all the femora.

Callipirepes, White, Mag. of Nat. Hist. Nov. 1839, p. 543.

The species here to be described seems to form a distinct genus among the *Capsini*, and has some interesting points of analogy with some of the other families. It is of an oblong elliptical form. Head small, with a distinct neck, in front slightly three-lobed. Antennæ (mutilated) situated on a slightly projecting lobe on the upper side of head, in front of the eyes, which are very prominent, first joint not so long as head and thorax, ciliated, cylindrical, rather thickest at tip. There is a depression between the eyes, which narrows and is continued to the back part of head, the narrowed part being impressed on the sides, no ocelli. Beak short, not reaching far beyond first pair of legs, apparently three-jointed, second joint longer than first and third. Thorax semicircular, not so broad as hemelytra, somewhat truncated behind, in front emarginate, and margined as are the slightly sinuated distinctly ciliated sides. Scutellum as long as head and thorax together, pointed. Hemelytra large, reaching beyond abdomen, the membranaceous part seven-veined, the two interior almost united at base, the two exterior united at tip. Legs slender, hairy. Tarsi three-jointed, first joint as long as second

* In 1814 Dr. Leach described in the Zoological Miscellany, vol. i. tab. 40, a New Holland species of *Coreidæ*, under the name of *Mictis crucifera*. It seems to be identical with the *Lygæus profanus*, Fabr. Syst. Rhyng, 211. 33. *Anisoscelis profanus*, Guérin, Iconographie, pl. 55, fig. 9. Burmeister regards it as synonymous with the *Lygæus sanctus* of Fabricius, and places it in his genus *Crinocerus*, the name he applies to that division of insects, separated from *Lygæus* of authors by Palisot de Beauvois, (and described by him in his 'Insectes recueillis,' &c. p. 204,) under the name of *Acanthocerus*. Mr. Macleay subsequently applied the name to a genus of *Trogidæ* (Horæ Ent. i. p. 136), so that the name of the latter must be altered, and if no other has been given it, I would propose that of Ceratocanthus, the type being the North American *C. æneus* (Macl. l. c. p. 137.)

and third together, claws furnished with pads. Abdomen flat above, slightly convex below, margined.

For this I propose the name *Calliprepes*. The species comes from Nepaul, and is named after George Robert Gray, Esq.

C. Grayii.

C. virescenti-luteus; thorace maculis 2 dorsalibus deltoideis rubris, scutello maculis 2 basalibus rubris; hemelytrorum parte membranaceâ lineâ basali obscurâ, coriaceâ, apice lineâ viridi transversâ.

Long. lin. 7, lat. thor. $2\frac{3}{4}$.

Hab. in Nepaliâ. Mus. Brit.

I may perhaps add, that the beautiful genus *Eucerocoris* of Mr. Westwood, the locality of which at its publication was unknown to its author, (Ent. Trans. ii. p. 22,) comes from Sierra Leone, and that a second species exists in the Museum collection, which appears to be distinct from the *nigriceps*. Should it prove a distinct species, I propose for it the name of

Eucerocoris Westwoodii.

E. flavido-testaceus, capite, thoracis lobo postico supra, scutelloque nigerrimis, thoracis parte antica abdomineque flavido-testaceis, hemelytris fuscescentibus lucidis; antennis, rostro pedibusque obscure ochraceis.

Long. lin. $3\frac{1}{2}$.

Hab. in Sierra Leone Africæ. Dom. Morgan. In Mus. Brit.

XIV. *On the Wings of the* Hemiptera. *By* R. J. Ashton, *Esq. F. L. S., &c.*

[Read 6th November, 1837.]

At a meeting of this Society, some months ago, I exhibited an insect (*Centrotus cornutus*) as affording an instance of the connection of the anterior and posterior wings during flight, in an order (*Hemiptera*) in which I believed it was not known to exist. I was not, at that time, aware of the fact which I have since ascertained, viz. that the possession of a connecting apparatus in the wings is not peculiar to the insect adduced, but is common (I believe without exception) to the whole order of *Hemiptera*, or to the allied orders of *Hemiptera* and *Homoptera*, of some entomologists. This has struck me as involving a somewhat curious circumstance, inasmuch as one of the orders of insects is founded principally on this character, and derives its name (*Hymenoptera*) (see Note 1) therefrom; it is not a little strange, therefore, that its occurrence *throughout* another order should not have been long ago noticed, as it renders the name *Hymenoptera* inappropriate as the designation of the order so named.

The existence of a peculiar uniting apparatus in some of the nocturnal *Lepidoptera* is indeed an old observation, but there it is not an universal, nor indeed an usual character, being found in very few instances.

As I believe that the structure by which this union of the wings is effected in the *Hemiptera* has never been described, I may perhaps be excused for offering a description of it.

I have discovered *two* distinct organizations whereby the wings are united in the majority of instances, and I conceive that whatever variations may exist in the structure in particular insects from the types I am about to describe, are merely modifications of one or the other of these forms.

In *Notonecta Glauca* there is found, at the hinder margin of the under side of the anterior wing, two small corneous projections, curved and inclined at the top towards each other, leaving merely a small slit or opening between them above, and forming together a short cylindrical *groove* or socket parallel to the hinder edge of the wing. (See Plate VII. fig. 5 a, b.) At the point which answers to this in the posterior wing (fig. 6 z), the membrane at the anterior margin is turned up and slightly backwards, and the edge is thickened so as to form a prominent and moderately

thick *rib*. This rib, when the insect unites its wings, passes through the narrow slit above mentioned, and thus catches and is retained in the *groove* during the insect's flight. Of the efficacy of this simple contrivance for the purpose in question, any one may satisfy himself by the difficulty experienced in disengaging the wings of one of these insects when united. I must not omit in this place to mention the instance exhibited here of the perfection *usque ad imum* with which all the creations of Omnipotence are endowed; for although the apparatus I have thus endeavoured to describe is so minute as to require an exceedingly high microscopic power to examine it, yet is the interior of the groove discovered to be lined with a pubescence apparently similar to that beneath the tarsi of many insects, doubtless principally for the purpose of protecting the membrane of the wing from abrasion or injury by friction whilst inclosed in it.

The other form of the structure to which I have above alluded is the following. In the insects so constituted, a small portion of the anterior edge of the hinder wing is turned upwards, and from it a simple corneous process projects backwards, the general form of which is represented at fig. 8, as it occurs in the above mentioned insect, *Centrotus cornutus*. This process does not occur upon the principal nervure of the wing which runs along the anterior margin, but rather on the (generally narrow) portion of membrane found anterior to that nervure, and quite at the edge of the wing. This tooth or process of the posterior wing catches into a corresponding *recess* formed in the hinder margin of the under side of the anterior wing, the edge of which, at that point, is bent down and reflected forwards, forming a small channel for the reception of the above process. (Fig. 7.) I have ascertained that the under side of the process above described is finely *dentated*, and have little doubt that there is a corresponding *indentation* in the *recess*, which considerably strengthens the union of the parts when joined.

The point at which the wings unite is, in all cases that I have examined, situated at the apical extremity of the hinder nervure of the anterior wing, and where that wing possesses a membranous piece at its extremity, as in *Notonecta*, is just at the point of division between the corneous and membranous points; consequently the point of union varies according to circumstances connected with the form, &c. of the wing, in some being proportionably nearer to, and in others further from the base of the wing.

From the examination I have made amongst insects of this

order, I incline to the opinion that the structure *first* described is the peculiar characteristic of the *Heteropterous* division of the *Hemiptera*, and that that *last* described is peculiar to the *Homopterous* division of that order. I think I am justified in estimating the former structure as the more perfect, and consequently more difficult to disengage of the two. I am perhaps incorrect in the view I now advance of the occasion for a different structure in the two divisions of this order, but the difference which presents itself in the nature of the wings in those two divisions naturally suggests it. May not the more homogeneous texture of the upper and under wings, and the comparatively firmer and more compact structure of the lower one in the *Homoptera*, require a less intimate fastening of the two together than in the *Heteroptera?* in which the wings, from the lower one being comparatively thinner and more membranous in its texture, and its structure being adapted for folding up when at rest, (which necessarily detracts from its compactness and firmness when extended,) are probably more exposed to accidental disturbances during flight, and more difficult to reengage when separated, thus requiring a comparatively more perfect and inseparable connexion.

By the detection of the above described apparatus, the true *alary* nature of the hemelytra in this order is established, which hitherto appears to have been more or less a subject of doubt amongst entomologists.

The difference between the simple structures I have above described, and the more complex series of hooklets which connect the wings of the *Hymenoptera*, is interesting.

I apprehend that were the wings of the latter not actually united along the greater part of their length, they would not, from their membranous texture, present one firm and *air-tight* surface to act on the air, which I conjecture to be essential in both these orders. This, in the *Hemiptera*, is effected by the more firm texture of the upper wing, and the *peculiar relative forms of* the two wings when united.

I cannot conclude without drawing attention to the circumstance, that the *Hemiptera*, in possessing this apparatus, appear to occupy the place of transition (as respects the wings) from the *Coleoptera*, in which the upper wings are simply organs of protection, to the *Hymenoptera*, in which they are purely organs of flight; those of the *Hemiptera* partaking in about equal degree of both these characters, the texture of the upper wing also being actually divided, so that about a moiety nearly approaches to each of the two orders in question, and the connecting apparatus

appearing also (as I submit) of a rudimentary or intermediate nature. (Note 2.)

Note 1.—I am aware that "ὑμὴν" also signifies "membrana," but assume that the word was elegantly used, originally, to denote the *peculiar* feature of the wings of the *Hymenoptera*, which the *yoked-connection* or *union* (quasi *matrimony*) between them presented, because used in the former sense of "membrane," it is quite as applicable to the *Homoptera*, *Diptera*, *Lepidoptera*, &c. which would deprive the name of its significance. In either case, however, it is now equally inappropriate.

Note 2.—Linnæus appears to have propounded an observation nearly approaching the above, when he says, "Hemelytra media quasi alas inter et elytra" (Syst. Nat. ed. 12, i. 534), though he was unacquainted with the existence of the uniting apparatus between the wings, which is the ground of the above proposition.

XV. *Observations on the Destruction of the Apple Crop by Insects.* *By* W. Spence, *Esq.*, *F. R. S.*, *&c.*

[Read August, 1838.]

After spending five weeks very pleasantly at Cheltenham, we bent our course, about three weeks ago, to this charmingly romantic watering place (Malvern), where, being close to the great cider districts of Herefordshire and Worcestershire, my attention has been so strongly attracted by the deplorable failure of the apple crop, and the apparent probability of its being caused by insects, that I cannot help addressing you to suggest whether it might not be desirable that the Entomological Society should institute an investigation into the cause of the mischief, which (as by all accounts it extends to Devonshire and throughout the kingdom, the cider growers declaring that where they usually made fifty casks they will not this year make five) will evidently cause a very serious loss, of which, in every point of view, it would be creditable to us at least to attempt to ascertain the cause; and this, it strikes me, might be best effected by calling upon such of the members as reside in the apple districts to communicate their observations, and to make inquiries as to the facts of the case.

I have of course made inquiries of the farmers near here, who gave me just the answer I expected—"Oh, a blight, caused by

the frosty nights in May." But that mere direct frost was not the cause, seems proved by their own distinct statement, that the blight took place *before* the full expansion of the blossom, which, it is well known, will bear a very severe cold before being unfolded. From such observations as I have been able to make, I am strongly inclined to suspect that the real cause of the "blight" is a pinkish coloured *Aphis*, of which I have invariably found swarms in the few leaves immediately surrounding the dead calyxes of the abortive tufts of blossom, or their most abundant exuviæ, when the leaves being completely killed and blackened, were deserted for more succulent pasture. Of their number an idea may be had from the fact that on one single apple leaf at the base of a tuft of dead blossom, I found *nine* pupæ of *Coccinella bipunctata*, which had evidently in their larva state found ample food from the *Aphides* close to them.

Now it is in this way that I conceive the mischief has been done. The few leaves accompanying a tuft of apple blossom are but half or one-third expanded when the blossom unfolds; but still there can be little doubt that they furnish the supply of sap (whether in its first or elaborated state, the vegetable physiologists must decide) which is to forward and complete the expansion of the blossom. If, therefore, this sap be intercepted by numerous *Aphides* just before the blossom is about to open, nothing can be more likely than that the blossom should not expand at all, but die and become abortive, as has actually taken place. And this supposition seems strongly confirmed by what I have repeatedly observed as to the *fruit*, viz. that whenever a single apple or cluster of two or three, as are now and then seen, have their *full size* and a healthy aspect, they are always accompanied by healthy and fully-expanded leaves, without any appearance on them either of *Aphides* or their exuviæ; whereas in the cases, which also occur occasionally, of one or more apples having survived in a tuft whose leaves have been attacked by *Aphides*, they are invariably deformed and not *one-fourth* of their proper size—in fact, mere abortions. Why the attacks of this *Aphis* have been so much more general and fatal this year than usual, may, I think, be explained by the very backward spring; owing to which, broods of young *Aphides* were hatched before the leaves were out, and probably subsisted on the sap of the *buds* of the apple trees, and were thus able in full force to assail the leaves the moment they expanded, and at once drain them of all their fluid; just as I observed, this spring, the tinged *buds* of sycamores, a full week or more before a single leaf was out, to be *covered*

with a numerous brood of very young *Aphides*, which subsequently I saw had transferred themselves to the leaves when they appeared.

I throw out these hasty ideas just as they suggest themselves, without at all considering them as leading to any conclusive result, which can only be obtained by far more extensive and minute inquiries than I have had an opportunity of making, and especially by observations began on the spot from the earliest commencement of the mischief, the communication of which I conceive might be obtained in the way already suggested, and which may very probably show that other causes have been concerned. It is very probable that this subject has already received the attention of the Society, but it so often happens that one errs by taking matters of this sort for granted, that I thought it best to run the risk of making a superfluous suggestion. Every thing connected with cider becomes now of additional interest, if what has been lately stated in a Devonshire paper in bewailing the failure of their apple crop be correct, that there is now a considerable and increasing export of it to Turkey, those good casuists, the Mussulmans, having found out that, not being *wine*, it cannot come under their prophet's prohibition.

Hops, in Worcestershire, are as complete a failure as apples. In addition to the hosts of *Aphides*, a *Haltica* has riddled the leaves like network.

XVI. *Entomological Notes. By the late* W. Sells, Esq., M.E.S.

My dear Sir, Norbiton, March 23, 1839.

On the other side is the little sketch of my plan for arranging Entomological illustrations which I promised you, and perhaps you may be able to prevail upon some of the young and active among the lovers of Entomology, to devote their diligent attention to working out some of its compartments; as by giving a rational and useful character to the pursuit, we add so materially to the interest, as well as promote the dignity, of the science which we cultivate.

Believe me always, dear Sir,
Very faithfully yours,
William Sells.

To J. O. Westwood, Esq.

A Plan for Arranging a Cabinet containing Illustrations of the Habits and Economy of Insects.

A cabinet of insects, intended to contain illustrations of the habits and economy of the different tribes, and to be of a comprehensive nature, should consist of not less than sixteen or eighteen ordinary sized drawers, with two sufficiently deep for the larger sized nests, &c., and two more of an intermediate depth. Table-cases for public institutions (*e. g.* the British Museum) are of course preferable.

The subjoined scheme is that which I have mainly followed in my own arrangement.

Transformations—as showing the several conditions of insect life.

1st. Separately—Ova, or eggs, arranged according to the different orders; egg-shells; egg-cases, as of *Mantis* and *Blatta*, and sections to show the interior of the same.

2nd. Larvæ, according to the different orders, with specimens showing the several moults of particular insects.

3rd. Pupæ, according to the orders.

4th. Shells, or exuviæ of pupæ.

5th. Cocoons and nests.

Combined—Showing interesting examples from the various orders

where the several changes are exhibited together, under one view; for instance, in the case of the bot among the *Diptera*. *a*. Horsehairs upon which the ova have been deposited; *b*. larvæ in the several stages of growth; *c*. the pupa; *d*. imago of both sexes.

The Economy of Particular Insects.

1st. Bees; showing the numerous and beautiful facts appertaining to this race of creatures; as comb, nests, parasites, &c., &c., in the honey, mason, carpenter, upholsterer, and other bees, including the *Bombi*.

2nd. Wasps illustrated in a similar manner.

3rd. Hornets ditto.

4th. Silkworms, and other silk-spinning larvæ.

5th. Gall insects.

6th. Spiders; their nests, egg-cases, silk, &c.

Sexual Distinctions; exhibiting the more striking instances in the several orders.

Monstrosities; hermaphrodism and imperfect development of parts.

Analogies between insects of different orders.

Position of Wings, in repose.

Parasites; a most interesting department.

Contrasts, as of insects, with the other classes of insects, viz., magnitude and minuteness.

Insects injurious to Man; directly, to his person,
indirectly, as attacking animals, viz. the horse, cow, sheep, &c.
as attacking vegetable substances, viz. the turnip, hop, sugar-cane; the wood-borers and timber-feeders; the destroyers of wool and furs; with specimens of the injured material.

Insects useful to Man; as cochineal, gall, silkworm, &c.

Dissections of insects.

Miscellaneous.

Notes.—Eggs should be punctured with the finest of needles, when they will dry without shrivelling; hot water destroys colour and makes them contract.

Larvæ that have been long immersed in spirits, and thereby much hardened, admit of being opened, stuffed with cotton, and dry very successfully.

Good illustrations of the principal digestive organs and parts of generation in insects, may often be procured from even old and otherwise damaged specimens, by immersing them in boiling water for a minute or two; and although the more delicate

parts, as the hepatic vessels, may not be shown, the œsophagus, stomach, and intestinal canal, also the ovaries, &c. will often be very perfect.

Experiments with portions of old Honeycomb.

[Read 3rd June, 1839.]

April 2. Subjected 30 grains of old honeycomb-cells, free from pollen, repeatedly to the action of boiling water by maceration, stirring them frequently; the little wax remaining at the outward edges of the cells became melted, and the cells separated from one another; when perfectly dry they weighed 27 grains, having lost only three grains in weight.

April 5. Weighed $2\frac{1}{2}$ ounces of comb, and boiled it in water for 10 minutes; strained the fluid, and obtained about 3 drams of wax; dried the remainder during 6 hours in an oven, when it weighed $1\frac{1}{2}$ ounces.

April 10. Placed $2\frac{1}{2}$ ounces of comb in an oven for 8 hours, it yielded only about 2 drams of wax; and the comb, although so long exposed to such considerable heat, weighed near 2 ounces.

The greater reduction of weight in the second experiment proves that much soluble matter had been taken up by the water in boiling.

April 15. Exposed a quantity of the comb which had been acted upon by boiling and then dried, to the heat of a coal fire, in a shovel placed over the same; as soon as it was quite exsiccated, it inflamed and burnt to carbon, each cell retaining its original form.

This change of the original waxen cell into a substance of so very different a nature is a curious and interesting fact, and not undeserving of further observation.

Note respecting the Egg-cases of Blattæ.

[Read October 1st, 1838.]

Having lately received from the Island of Jamaica, among other things, many specimens of the egg-capsules of three species of *Blattæ*, I was induced to examine their internal structure, and, as

the results are somewhat interesting to the entomologist, they appeared to me to be not unworthy of being submitted to the notice of the Society.

The egg-cases of *Kakerlac orientalis*, or common house cock-roach of Jamaica, is longer and flatter than those of the other species, having twenty-two to twenty-four teeth along the thin serrated edge, which corresponds with the number of eggs contained within. The latter are lodged in two layers placed transversely, twelve in a row; there is a septum, or partition, running the whole length of the case, and separating the rows of eggs; each egg has its own distinct recess.

The cases of *Blaberus Maderæ*, commonly called knocker in Jamaica, are shorter than the former, but much wider, and have sixteen dentations at the edge; one of these contained ninety-six specimens of a small species of *Chalcididæ*, and another is filled with the pupæ (I apprehend) of a similar insect.

Those of another species, which I cannot designate, have a curved reniform figure, with very minute dentations.

Most of the cases were found empty, and the fissure where the young *Blattæ* had come forth was slightly open; others had a round perforation through the side of the capsule, at which the parasitic *Chalcididæ* had made their exits.

XVII. *Description of some Insects which inhabit the tissue of Spongilla Fluviatilis.* By J. O. Westwood, F.L.S.

[Read 3rd December, 1838.]

(Plate VIII. fig. 1—12.)

Perhaps no more complete proof could be adduced to prove the superiority, in the present state of zoological science, of analytical over synthetical inquiries, and the evident impossibility, from our present materials, to construct a perfectly harmonious and complete natural system, than some recent inquiries which have occupied the attention of the Academie des Sciences during the past autumn. Thus, whilst one set of naturalists have been at variance whether the remains of the *Amphitherium*, *Phylacotherium*, or *Botheratio-therium*, as it has been termed, be those of a reptile or an aquatic or terrestrial mammalian, others have been directing their attention to the opposite extreme, in order to ascertain whether the family of the sponges belong to the animal or vegetable kingdoms.

By Cuvier the latter productions were placed at the extremity of the animal kingdom: "où l'on n'a pu encore observer de polypes ni d'autres parties mobiles. On a dit que les éponges vivants éprouvent une sorte de frémissement ou de contraction quand on les touche, que les pores dont leur superficie est percée palpitent en quelques sorte, mais ces mouvements sont contestés par M. Grant, et MM. Audouin et Milne Edwards adoptent l'opinion de M. Grant."* (*Ann. des Sc. Nat.* xi. pl. xvi.)

Recently, however, Messrs. Laurent and Dujardin have reaffirmed the animality of the *Spongilla flaviatilis*, in memoirs read before the Academy, and in the *Athenæum* of last Saturday (December 1, 1838) it is stated that, in addition to the discovery of dilatation and contraction in the vesicles of the *Spongilla*, M. Dujardin has observed another character in support of his theory of animality,—it is, that they are furnished with exceedingly fine filaments, the undulations of which influence the movement of the water around them.

On the other hand, John Hogg, Esq., F.L.S., &c., has recently made a series of observations on the common English *Spongilla fluviatilis*, which he proposes to communicate to the Linnæan Society at the meeting of to-morrow evening; and having constantly found the *Spongilla* inhabited by minute insects, clothed with exceedingly fine and long setæ, he is induced to believe that the undulations and movement of the water is chiefly attribu-

* *Règne Animal*, 2d. ed. p. 322.

table to these insects, and not to any animal principle in the body of the sponge itself.

These insects, which he has placed in my hands for examination and description, are as anomalous as the substance they inhabit. They are of a small size, not exceeding one-seventh of an inch in length, of a soft membranous consistence, and of a pale greenish colour, which is more vivid in the legs. They are depressed, and of an oblong-oval shape, (fig. 1 upper, 2 underside, magnified,) and composed of thirteen joints, the first of which, forming the head, is small, having a black patch on each of the posterior angles, wherein are several large granular shining ocelli (fig. 3 under, 4 lateral view of the head). The antennæ (fig. 5) are nearly half the length of the body, arising from a thickened basal joint in front of the eyelets; the terminal part of the antennæ is exceedingly slender, cylindrical, and very indistinctly articulated. The upper side of the head is furnished with several long setæ; its underside is very convex; the lower lip being of moderate size, and terminating in a transverse line, behind which are two short oblique darker spots; the sides of this lip are greatly widened towards the base. On each side of the sides of this lip another line extends in an oblique direction to the lateral anterior angles of the lip, and from this spot on each side arise two long and exceedingly delicate setæ, as long as the antennæ, and constantly porrected, having a small space between them at the base, where they are directed upwards. One in each side of these two pairs of setæ is darker-coloured and stronger than the other. They are entirely destitute of articulation. Such is the entire structure of the mouth, as far as I am able to perceive it; thus there are no rudiments of labrum nor palpi; the mandibles and maxilla are represented by the four porrected setæ, and the lower lip is destitute of ligula and palpi*.

The thorax is composed of three segments, of which the prothorax is the smallest. To each of these three segments a pair of rather long, slender legs (fig. 8) is attached, composed of a strong coxa, short trochanter, robust femur, elongated tibia, and a two-jointed tarsus, destitute of any terminal unguis; the legs are sparingly furnished with long, slender, rigid hairs. The upper surface of these segments indicate not the slighest appearance of wings, or their rudiments. The nine terminal segments of the body constitute the abdomen; the first of these is smaller than the metathorax, and the remainder become gradually smaller; they are furnished at each side with a small setigerous tubercle, which is larger in the terminal segments (fig. 9), and in which the setæ,

* We might, perhaps, consider two of these setæ to be the labial lobes, and two to represent the maxillæ, the mandibles being obsolete.

with which it and the sides of the body are furnished, are very greatly elongated. On the underside (fig. 2) each of the seven basal segments of the abdomen is furnished on each side with a long and slender, flattened filament, destitute of ciliæ, and which is directed, first, inwardly, and then backwards. These filaments, fourteen in number, are articulated,* and have much the appearance of weak legs, but they are evidently organs of respiration, one or two slender tubes being easily perceivable running through them, and terminating in a point. The articulations do not appear of equal size throughout these appendages (fig. 10, 11, 12). The eighth abdominal segment is destitute of these filaments, but is furnished with larger setigerous lateral tubercles than the preceding joints, and the terminal segment is small and simple, in one specimen it was much larger and conical. Each of the abdominal segments is furnished with a pair of leathery darker coloured patches, emitting from its posterior margin three long setæ (fig. 6, 7).

The inquiry as to the relations of this insect and the order and family to which it belongs, is attended with great difficulty, from the anomalous characters which it possesses.

Its small size, green colour, structure of the mouth, and form of the legs seem to indicate a relation with such families as the *Aphidæ* and *Coccidæ*, which possess species which never acquire wings. *Coccus*, as I have discovered, possesses a mouth, consisting of four exceedingly long and slender setæ, although Mr. Curtis, in this month's number of his British Entomology, states that it consists only of three setæ; but these insects are aquatic, and are furnished with external elongated organs of respiration, which exist in no known imago. If regarded, then, as larvæ, the question is still more perplexing; the general structure of the insect, and the particular structure of its mouth, prevents it from being considered as Coleopterous, Orthopterous, Lepidopterous, Hymenopterous, Strepsipterous, or Dipterous. It will not enter, as a larva, into any Hemipterous or Homopterous family, so that there only remains the *Neuroptera*, amongst which we are to trace its relations; and it is in this order that we find external organs of respiration in the aquatic larvæ. But the structure of the mouth prevents our associating it with any group of which the larvæ are aquatic, and known. The *Perlidæ*, *Ephemeridæ*, *Libellulidæ*, *Sialidæ*, and the order *Trichoptera*, are well known in the larva state, whilst *Boreus* and *Panorpa* are the only

* The respiratory filaments of *Sialis* are also articulated, being the only known instance, according to M. Pictet, in which such a structure has been observed to exist. No known Ephemerideous larva is destitute of the three anal filaments.

genera belonging to the order whose transformations are unknown; and the observations of Stein and Macquart upon the pupæ of the latter are sufficient to prove that these aquatic insects cannot be the larvæ of *Boreus*. There remains, however, to be noticed the anomalous genus *Acentropus*, respecting whose order entomologists are so much at variance. It is barely possible that they may be the larvæ of that genus. Without, however, deciding that these insects have not arrived at their perfect state (in which case the name *Branchiotoma Spongillæ* may be applied to them), it may perhaps be the most advisable course to regard them as larvæ of some extraordinary group not hitherto detected, and, at the same time, to express a hope that persons having an opportunity of examining the *Spongilla* will endeavour to trace the transformations of this perplexing species.

XVIII. *Rough Notes on the Habits, Manners, &c. of some of the British* Brachelytra. *By* F. Holme, Esq., M.E.S.

[Read 5th March, 1838.]

The division *Coleoptera Brachelytra* of Latreille, (corresponding nearly with the old Linnæan genus *Staphylinus*,) is one of the most curious and interesting groups, in the variety and singularity of its forms, and the various localities and pabula frequented by its different genera, which our Coleopterous Fauna comprises: while in the number of its indigenous species it far exceeds any other British division of equal rank among the *Coleoptera;* its strength in this respect nearly equalling the united forces of the *Geodephaga* and *Rhynchophora*, the two groups which most nearly approach it in point of numbers. The metropolis, indeed, of the *Brachelytra* is said by Kirby and Spence to be, "as far at least as we can judge from our present catalogues, within the temperate zone, particularly in Britain." Dejean, in his catalogue, gives only 434* species: while Mr. Stephens, whose cabinet might contain in 1828, according to the supposition of Kirby and Spence, above 600 species, enumerated no less than 852 in his invaluable Systematic Catalogue published in 1829, which he increased to 892 in the second edition of his Nomenclature, published in 1833. Notwithstanding this vast increase from the numbers of Marsham, who in 1802 could record only eighty-two species under the

* In the edition of 1833, Dejean gives 789 species, European and exotic.—*Entom. Edin.*

Linnæan genus *Staphylinus*, almost every cabinet of any extent contains Brachelytrous species unnoticed by Stephens: and the recent discovery of such singular forms as the genus *Pseudopsis* * of Newman, and the anomalous genera *Centroglossa* and *Deinopsis*, detected last year by my friend A. Matthews, Esq., are indications of the novelties which may be expected from researches in this quarter. Still, the *Brachelytra* have not hitherto met with that degree of attention from British Entomologists which might have been expected: the minuteness of many of the species has occasioned their being overlooked, and the want of a good English monograph, with magnified figures, and outlines of the trophi of each genus,† combined with the small size of the insects, and the great number of closely allied species contained in some genera, has attached a discouraging degree of difficulty to the investigation of these insects, and in too many instances has caused the drawers containing the *Brachelytra* to be left a confused crowd of specimens, without any attempt at nomenclature or arrangement. It is to be hoped that the daily increasing zeal with which Entomology is now cultivated in these islands will soon remove from our naturalists the stigma of having neglected a group which its geographical distribution places so especially under their charge.

The habits, food, and localities frequented by the various genera and species of this extensive division, present so much diversity, that I trust I may be excused by the Entomological Society for submitting to their notice the following rough Notes on such points as have fallen under my own notice in my entomological rambles, in the course of which I have always paid particular attention to the manners of these insects. I do not flatter myself that my remarks will contain much new matter, but I shall be amply satisfied if they give an impulse in the same path to the curiosity of some more keensighted observer. I have arranged my remarks in the order of genera given in the last edition of Stephens's Nomenclature.

The minute species composing the curious family *Pselaphidæ* seem, as far as my observation on them extends, to be the most retiring and subterraneous in their habits of all *Brachelytra*, being rarely found fairly above ground, or even immediately under

* A second specimen of the *Pseudopsis* has been taken by Mr. Matthews at Shotover Hill, near Oxford.

† The beautiful figures of Curtis, as far as they go, leave nothing to be wished for in this respect; but unfortunately they include but few genera, and among these but a small proportion are from the minute *Aleocharæ* and *Stenidæ*, which most require illustration.

stones, &c., but generally imbedded in the loose earth at the roots of grass, or lurking under wormcasts and in the midst of thick damp clusters of moss. They seem to affect the neighbourhood of ants' nests, and I found once a species (I think *Arcopagus bulbifer*) torpid among a conglomerated lump of ants: a curious circumstance, since, if I remember right, Messrs. Kirby and Spence mention the fact of the rare *Atemeles strumosus* having been found in a similar situation. The species, according to Stephens, all prey on *acari:* but it is not impossible that they may also commit occasional depredations on the larvæ of the ants. The history of the *Pselaphidæ* shows remarkably the progress made of late years in the knowledge of the minute forms: only a single species, *Euplectus minutus*, was known to Marsham: Stephens, in 1833, enumerated thirty-two: and several have been since discovered.

The history of the two first genera of the *Tachyporidæ*, *Autalia*, and *Falagria*, which form the link between that family and the *Pselaphidæ*, appears to be somewhat imperfectly known. Most of the species are considered, probably from their small size, to be scarce or local: several new species have been detected since Stephens described them, and it is probable that on a fresh revision *Falagria* will require sub-division, as some of the species differ greatly from others in the form of the thorax.

Hygronoma dimidiata, which was almost unique when Stephens described it in his Illustrations, now seems to occur not uncommonly in various parts of the country: several specimens have been taken by Mr. Matthews at Weston-on-the-Green: it runs excessively fast.

Notwithstanding the common occurrence of *Astilbus canaliculatus*, I do not remember to have seen the fact of its being apterous anywhere noticed: I detected this at first accidentally, and verified it by the examination of numerous specimens. I think it has been stated by Mr. Stephens, though I am unable to find the passage, that *Achenium depressum* is in some specimens winged, in others apterous: but I believe the present is the only Brachyletrous species in which the wings are constantly absent. Its gait is also singular, as it runs constantly on tip toe, at the full stretch of its limbs, like the *Gœrius olens* when throwing itself into an attitude of defiance.

I have a specimen of *Atemeles acuminatus* which was taken some years since near Penzance in Cornwall, running on the stem of a nettle: I mention this because I have heard it spoken of as occurring only under stones and in similar situations.

The species formerly comprehended under the genus *Aleochara*, notwithstanding the numerous subdivisions into new genera lately adopted, still present great difficulties to the student, in the way of specific distinction, from their generally minute size and close resemblance. I must confess, also, that in this part of Mr. Stephens's work, where the descriptions of most of the species are abridged from Kirby's MSS., I do not find the same facility in naming species by their aid, as where Mr. Stephens has relied on his own powers of description. As many of the species vary greatly in size, (I have a series of *Polystoma obscurella* varying from a line and half to nearly three lines in length,) and the segments of the abdomen in preserved specimens are often so much retracted within each other as sensibly to diminish the length, it is evident that measurements will not afford the same assistance as in most families: while the differences of shade in the colouring of allied species, though obvious to the eye, are not easily marked by words, and this difficulty is increased by the fine and changeable pubescence with which most of the species are more or less clothed.

Many of the smaller species feed on decaying fungi and other vegetable matter, as well as on the *acari* and other animalcula contained in them: I have often seen them in great numbers on the heaps of or-weed on the Cornish shore, (which give shelter to innumerable minute insects,) and have ascertained by close inspection that they were feeding on the vegetable juices of the decaying weed. Several species (I remember particularly the pretty *Aleochara Cursor*) when disturbed, by bending the head under the thorax, raising the abdomen, and protruding their long slender legs straight forward, assume so completely the appearance of a ragged scrap of or-weed, that until my eye detected them in the act of metamorphosis, I was often at a loss to know what had become of the specimen which I had marked as the next victim for my bottle. In these situations they are much preyed on by the *Cafii*, which in their turn fall victims to *Broscus cephalotes* and *Creophilus maxillosus*.

The small natural group formed by *Bolitochara carbonaria*, *B. subpubescens*, *B. foveola*, &c. appears to be a maritime one; at least it is only on the seashore that I ever found them in any numbers; and the bulk of the maritime specimens considerably exceeds the dimensions assigned to each species by Stephens:— of *B. carbonaria* (which I distinguish from its allies by the pale tip of the elytra), not one, out of several specimens I lately received from Cornwall, falls short of $1\frac{1}{2}$ line, and some are more,

Stephens's measure being only a line :—*B. foveola,* which Stephens notes as rare, but which is the commonest of the group on the Cornish coast, varies from $1\frac{3}{4}$ to $2\frac{1}{4}$ lines; Stephens's dimensions being from $1\frac{1}{2}$ to $1\frac{3}{4}$ lines.

Bolitochara inquinula, said by Stephens to be rare, is not uncommon in Gloucestershire and Lancashire, in putrid fungi, in autumn.

Bolitochara atriceps, said by Stephens to be "not very common," I found in abundance in decaying fungi in Winstanley Park, near Wigan in Lancashire, in September: it is an extremely pretty species, bearing great resemblance in the disposition of its colours, as well as in its habitat, to the *Bolitobii,* though differing altogether in form.

The rare and beautiful *Bolitochara collaris* is taken occasionally at Weston-on-the-Green by the Rev. A. Matthews.

Oxypoda alternans occurs in fungi in September, not very unfrequently, near Mersey Hampton, in Gloucestershire.

Gyrophæna fasciata is found occasionally near Mersey Hampton, but not very common, though I once swept a considerable number out of an agaric. The posterior edge of the thorax is rufous in immature specimens, and the abdomen and disk of the elytra nearly testaceous. Besides the two thoracic punctures noticed by Stephens, there are two other lateral ones nearly equidistant. I had at first difficulty in identifying the species, as Stephens (probably from inadvertence) assigns to it a length of only three-fourths of a line; but on reference to Marsham, whose *St. fasciatus* is quoted by Stephens as a synonym, I there find the correct dimensions, $1\frac{1}{4}$ line given.

Gyrophæna polita, said by Stephens to be "rare near London," is common near Mersey Hampton in autumn. The two larger punctures at the back of the thorax, usual in the genus, are observable in this species, though somewhat obsolete, and not noticed by Stephens. In one of my specimens, apparently immature, the base and apex of the abdomen are dull piceo-rufous, but the intermediate space deep black, thus showing a tendency to the belted abdomen of the other species.

Aleochara crythroccras. This species, which, from being marked † in Stephens's Illustrations, (though not in the last edition of his Nomenclature,) I conclude to have been considered at that time extremely rare, I took in some plenty in Winstanley Park in September. My specimens differ from Stephens's description in being a trifle larger; the rufous suture is also very narrow near the scutellum, but expands towards the apex, and the

elytra are narrowly tipped with dull rufous: the mouth also is conspicuously rufous like the antennæ.

Aleochara fuscipes never fell under my notice in Lancashire: I should have concluded it to be a southern insect, but the *Entom. Edinensis* states it to be as common in Scotland as it is in England.

Pella funesta I took in the Scilly Islands: from Stephens's account it appears to be a very rare insect.

Is *Callicerus Spencii* common in any English locality? I have heard that it is more common on sandy shores in Ireland, and some years since I availed myself of a calm to land from a yacht in Dundrum Bay, county Antrim, for the express purpose of hunting for it, as it is said to occur there; but I had no success. For my own specimens I am indebted to the Rev. G. T. Rudd.

In the two first species of *Mycetoporus*, I should have been glad if Mr. Stephens had given some additional characters for discrimination, beyond the different proportions of the terminal joint of the antennæ, as this appears to vary greatly in individuals; and, judging from my own specimens alone, most of which are in this respect *intermediate* between Stephens's two descriptions in the proportions of this joint, I should feel tempted to agree with Gravenhorst against Stephens, in considering *Myc. rufipennis* a mere variety of *Myc. analis*: "sed non nostri tantas componere lites."

The beautiful genus *Bolitobius* affords, in some of the species, a remarkable illustration of the extent to which the length of the specimen is often affected by the retraction of the joints of the abdomen within each other after death. The blue-black tip of the abdomen in the two first species is intersected by a ring of yellowish white, which is sufficiently obvious while the insect is alive and in motion: but after death it is so completely withdrawn into the preceding segment, as to be rarely visible in a cabinet specimen, unless carefully stretched in setting.

I may observe that in Gloucestershire and Lancashire, where I have principally collected in autumn, the relative frequency of *B. lunulatus* and *B. atricapillus* is the reverse of that given by Stephens for the metropolitan district, the latter being extremely common, and the former so rare, that I have only a single specimen in my cabinet, which was taken some years since in Gloucestershire. Perhaps, as *B. lunulatus* is said by Mr. Dillwynn to be "not common near Swansea," it may be a southern species relatively to the other, though the Entom. Edin. says that both species are "not unfrequent" there, and occur in company.

I doubt whether all the species described by Mr. Stephens may

be truly distinct, as the testaceous margins of the abdominal segments appear to be become suffused when mature: and in those in which the thorax is testaceous during life, it often becomes so much suffused in a few hours after death, that it appears to be dark piceous with testaceous margins. The delicacy of the colouring in these insects probably occasions this rapid change, which I ascertained by examining specimens minutely when alive, and dividing them afterwards from the others: but having no works on Entomology with me at the time, I was unfortunately unable to note the species.

I have nothing to add relative to the remaining genera of the *Tachyporidæ* except a few localities, which I have already communicated to the Society in the catalogue of Penzance *Coleoptera*.

With reference to the magnificent *Velleius dilatatus*, hitherto unique* as British, which stands at the head of the *Staphylinidæ* proper, it may not be amiss to mention that I was informed some time since, I think by a continental naturalist, that in addition to haunting hornet's nests for the purpose of preying on the larvæ, as noticed by Mr. Stephens, it frequents the holes perforated in trunks of trees by Longicorn and Lepidopterous larvæ, on which it feeds; issuing from this concealment only at night, when it has been occasionally taken on the trees in mothing: this may not be a new fact, but I think whatever may tend to facilitate the acquisition of so fine an insect in Britain is worth noticing.

Creophilus maxillosus. The variations in bulk of this conspicuous and well-known species may serve as an obvious example how little the mere dimensions are to be regarded as a rule of specific distinction among the *Brachelytra*, as I have above hinted in my remarks on the *Aleocharæ*. Of the specimens standing in my own cabinet, all from the same locality, (the Cornish coast,) the largest measures, with the mandibles, full 13 lines long; the smallest barely 6½ lines, or not quite half the other: and the variations in the relative proportions of the heads and mandibles in the different species are not less obvious. Some specimens also are so completely denuded as to present scarcely a trace of pubescence on any part of the body, while others are thickly pubescent except on the head and thorax: the colour too of the pubescence varies, the lighter parts being in some white, in others greyish, and in old specimens partaking of a griseous brown. All these variations, if observed in an *Aleochara* a line long, would probably have caused its division into three or four species.

* Since this was written, a second specimen has been taken at Southend by the Rev. F. W. Hope, in the autumn of 1840.

I think this species, though nowhere uncommon, abounds more especially in the west of England: on the Cornish coast it occurs in hundreds under every heap of seaweed,* and in Devonshire I have found numerous specimens dividing the possession of a dead mole or other small carcase with *Necrophori* and other *Silphidæ*. It differs, as is well known, from most of its allies, in coiling itself up and remaining motionless, instead of assuming a hostile attitude, when disturbed: in this position the polished thorax and head are nearly concealed, and the general aspect is more that of a hairy caterpillar than a Coleopterous insect.

The three pubescent species from which Mr. Stephens has formed his genus *Trichoderma*, appear to frequent a somewhat different pabulum to their near allies the true *Staphylini*, occurring more frequently in dung, particularly cowdung, than in carcases, while the *Staphylini* frequent carcases, the dung of horses, &c. and prey frequently on living worms, &c., but are rarely found in cowdung, the favourite haunt of the *Trichodermæ*. The *Staphylini*, also, are often seen on walls and pavements basking in the sun, and one species at least, *St. erythropterus*, climbs trees with readiness, running along the branches in search of Lepidopterous larvæ, &c. on which I have frequently found it feeding:—while the *Trichodermæ* affect situations and habits more in unison with their sombre colouring, and rarely expose themselves to view unless when on the wing from one feeding place to another. The colour of the wings also varies in the two groups; those of the *Trichodermæ* being dirty ash-grey, of the *Staphylini* transparent iridescent fulvous: and though a distinction drawn from such a circumstance may appear trivial, I have noticed that similar tints in the membrane of the wing pervade natural groups so generally, throughout the *Coleoptera*, as to afford no bad diagnosis.

The *Trichodermæ* appear essentially monogamous; one pair, male and female, is generally found in possession of a mass of cowdung: the *Goërius olens* I have remarked to be equally so; and it is probable that a similar propensity pervades the *Staphylinidæ*, but from the gregarious habits of most of the species, it is less easily ascertained than in the *Trichodermæ* and *Goërii*, which mostly live in solitary pairs.

The pile or pubescence in the *Trichodermæ* appears to be remarkably fixed and close: I never remember to have met with a denuded specimen.

The species composing the genus *Staphylinus*, as now restricted,

* In Scilly, however, I took only a single specimen.

appear to arrange themselves into several small natural groups, each consisting of two or three species closely resembling each other in form and colour. The first group comprehends four species, *S. erythropterus*, *S. castanopterus*, *S. stercorarius*, *S. æriceps:* the first of these abounds everywhere; the others, as far as my own experience goes, are rare. Stephens speaks of *St. stercorarius* as "common;" the only locality where I ever found it so was the Look-out Hill, by Weymouth, of which it appeared to have exclusive possession, as I never found either of the others there. In Gloucestershire I have taken only a single specimen: it appears, however, to be pretty generally, though thinly, distributed throughout England.

Most of the specimens placed in cabinets as *St. castanopterus* are nothing more than highly coloured individuals of *erythropterus;* the true *castanopterus*, as may be ascertained by an inspection of Kirby's specimens in the collection of the Entomological Society, is a smaller and slender insect, with the abdomen more gradually attenuated, independent of the aureous scutellum, (which is black in the other,) and other minute distinctions. *St. æriceps*, judging from my single specimen, stands in the same relation to *stercorarius* which *castanopterus* bears to *erythropterus*, being smaller and of a much more slender habit: in my example, also, the femora are black, and the pubescence on the *under* side of the abdominal segments aureous, that on the upper being dull silvery.

I believe it is an unnoticed fact that any Coleopterous insect preys on the wing; but I once observed a specimen of *St. erythropterus*, which I had taken in my hand on the wing and released, while it flew off in the bright sunshine; and I distinctly saw it make repeated darts at the gnats, as it rose in the air in spiral circles:—whether it caught any I could not perceive.

The three following species, *St. chalcocephalus*, *St. æneocephalus*, *St. æneicollis*?, form a very natural and closely allied group:—they are much more slender, in their general proportions, than those of the preceding section; and show an affinity, in their shorter and less powerful mandibles, smaller and more rounded heads, indistinct necks, and in the metallic gloss of the head and thorax, with the species standing at the head of the genus *Quedius:* and their approximation to this and the following genera is still further indicated by the rows of larger punctures on each side the thorax, which are more or less visible in all the three species, and particularly obvious in *St. chalcocephalus*. As I am

not quite certain of the correctness of my nomenclature, and as in many cabinets the three are confounded under the common name of *æneocephalus*, I shall add short characters of them as they are named in my own collection:

St. chalcocephalus: the broadest and stoutest of the three; a slightly raised *concolorous* shining line between the antennæ; "head and thorax brassy, finely punctured, with very delicate pubescence, the latter glossy, with two rows of larger impressions, and four still larger on the lateral margin;" elytra red-brown, with delicate brown pubescence; abdomen clothed with a very delicate *pale* brown pubescence, with darker dots and longitudinal lines; antennæ dark rufous.

St. æneicollis? the narrowest of the three; antennæ pitchy-brown, inclining in some to ferruginous; a raised *brassy-yellow* line between the antennæ; head and thorax blackish brass, punctured, with two irregular rows of somewhat larger punctures on the thorax; elytra deep pitchy ferruginous, paler at the suture and margins; abdomen clothed with a short close brown pubescence, paler at the base of each segment, and with traces only of pale longitudinal lines.

St. æneocephalus: shorter than the others, and intermediate in width; nearly uniform brassy-brown, pubescent, the abdomen obscure. The *St. sericeus* of Marsham, under which name a pair stand in Mr. Vigors's cabinet now in the possession of the Zoological Society; but one of these (a broken specimen) is, unless I mistake, *St. chalcocephalus*. Each species, it should be observed, has a narrow line down the middle of the thorax free from punctures.

My attention was first drawn to this subject by capturing at Ryde, in August, 1835, what I supposed a remarkably high coloured specimen of *St. æneocephalus*, but which I found on examination to agree closely with Mr. Stephens's description of *chalcocephalus:* I considered this a great prize, as *chalcocephalus* was then marked † in the "Illustrations," but shortly after I picked up another in the streets of Bath, and on re-examining numerous Cornish specimens then standing in my cabinet as *æneocephalus*, they all proved to belong to either *chalcocephalus* or *æneicollis*?; while on my subsequent visit to the Scilly Isles, I was unable to detect either of those species, though what I consider the true *æneocephalus* abounded in all parts of the group. All my specimens of *æneicollis*? are Cornish, but I have been shown several taken near Oxford: *chalcocephalus* appears to be found throughout

the country; I have taken it in Kent, Essex, Lancashire, Gloucestershire, Oxfordshire, and Ireland, besides the localities noticed above.

St. brunnipes is apparently an autumnal species; it is very common under stones in September and October, but I scarcely ever took it earlier in the year. To the same section with it would belong a species which appears to be undescribed:

St. semipolitus mihi. Length 7½ lines; black; head small, rounded, and, as well as the thorax, very glossy and polished, and somewhat distantly punctured, but on closer examination *numerous minute punctures are seen interspersed with the larger ones;* vertex of the head and dorsal line of the thorax nearly smooth; elytra dull brassy, with a few long hairs, minutely strigose-punctate, with a single very large puncture on the disk towards the apex, and one or two others towards the base; abdomen dull black, strongly margined, the penultimate segment narrowly edged with whitish; punctured, with two large punctures on each side of each segment; mouth and antennæ piceous-black; palpi rufo-piceous; femora and tibiæ brassy black, with a slight aureous pubescence; tarsi, especially the anterior, bright piceo-rufous.—I have taken three specimens, two in Christ Church Meadow, Oxford, and the third at Kemp-Town, near Brighton; it approaches nearest to *S. cantianus*, but is distinguished by the colour of the tibiæ: Mr. Waterhouse pronounced it decidedly new to England. I have not however had an opportunity of consulting the works of Gravenhorst or Mannerheim.

Britain has been considered by Messrs. Kirby and Spence to be the metropolis of the *Brachelytra:* and this is in some degree corroborated by the fact that the *Goërius olens*, which may probably be considered as the typical species of the whole division, though so abundant in Britain, is by no means equally common in any part of the European continent, and in Sweden, according to De Geer, is so rare that he never took a single specimen: and Linnæus was even led by its rarity to doubt its rank as a species, considering that it might be a variety of *Creophilus maxillosus*, and denuded of its pubescence by age! Its habits are too well known to require any remark, and it carries its sanguinary disposition even into captivity, destroying its fellow prisoners without mercy if placed in the collecting bottle. I have frequently had occasion to remark the tacit homage paid to the prowess of this and even smaller *Brachelytra* by the *Harpalidæ* and other predacious families, which invariably take to flight at their approach;

the only exception to this which I remember to have witnessed was given by the maritime species *Broscus cephalotes*, which I have seen defend its prey stoutly against *Creophilus maxillosus*.

The *Goërii* are monogamous: a pair is frequently found in a crevice, in the side of a quarry or gravelpit, with their broad heads occupying the entrance of their den, ready to dart out on any hapless insect which may fall from the top.

None of the other *Goërii* appear to be very common: four or five years ago, when a tyro in Entomology, I took a remarkably fine specimen of *G. cyaneus*, near Broughton Hall, in Staffordshire, but unfortunately gave it away:—the only other species I ever met with are *G. punctulatus* and *G. morio*, neither of which are very uncommon in the west of England, particularly the Scilly Isles: these two species appear very closely allied, but those to which I have affixed the name *G. morio* are somewhat slenderer than the others, have narrower heads, and less blue gloss on the elytra. I found both species together, in company with *Oeypi*, on the shore, and often under coarse mould on the cliffs close to the sea.

The *Oeypi* are more elongated in form than any of the preceding genera, and their long abdomen has a serpentine lateral motion in running, which resembles that of a worm more than an insect. The species resemble each other very closely in form, and different specimens of the same species vary greatly in dimensions: my smallest specimen of *O. similis* is scarcely $4\frac{1}{2}$ lines long, my largest nearly 8 lines. *O. picipes* differs from it in little that I can distinguish except its somewhat greater breadth and bulk, larger head, and somewhat more glossy hue. *O. compressus*, of which I have a Cornish specimen, is distinguished by its bright ferruginous legs: *O. angustatus*, and *O. phæopus*, the two other species described by Mr. Stephens, I never met with.

Microsaurus lateralis, the *Quedius lateralis* of Stephens's "Illustrations," is apparently a very rare British insect, as he mentions only two indigenous specimens as being then known: I took, however, a fine specimen out of horsedung, in Gloucestershire, in September last. My specimen is scarcely five lines long: it is an insect of a remarkably short, broad, thickset figure, with a large head, powerful jaws, and very large eyes; the abdomen is short and broad, like that of *Emus hirtus*, but diminishing somewhat in breadth towards the apex: in my specimen there is a large puncture or foveola on the occiput, which is not mentioned by Mr. Stephens; and the deflexed edge of the elytra is not "pale

testaceous," but deep clay-colour, which colour does not appear on a vertical view.*

The *Quedii*, though closely allied to the *Philonthi*, have sufficient differences in habit to enable a practised eye to distinguish them at once; for, exclusive of the difference in the anterior tarsi, &c., their broader and rounder head, less distinct neck, and more attenuated abdomen, at once mark them. Their habits, too, differ from those of *Philonthus;* for, though some of the species are occasionally found in dung or decaying animal matter, the exclusive pabula of the *Philonthi*, the majority are found under stones, at the roots of grass, and frequently under loose bark on the branches of trees, where they prey on earwigs, woodlice, &c. Most of this genus, and also of the *Philonthi*, are much on the wing when the sun shines. As I have nothing of interest to mention relative to the habits of this genus, I shall proceed to give a few localities of the species noticed by Stephens as among the less common.

Quedius gracilis: Gloucestershire and Lancashire; not uncommon in dung.

Q. pyrrhopus: Gloucestershire, under stones; not common.

Q. hæmorrhous: under bark of trees, near Southend, and in Kent. I took many at Brome Park, the seat of Sir Henry Oxendon.

Q. hæmopterus: with the last, but less common; also in Gloucestershire, where I never found the other; the red on the elytra in both these species is much more vivid when alive than after death.

Q. suturalis: I have several specimens of this not very common insect, most of which were taken, if I remember right, in Cornwall and Devonshire, in dung, though I do not find it mentioned in my local catalogues. I have also taken it in Gloucestershire.

Q. erythropterus: in Lord Bathurst's park, near Cirencester, Gloucestershire.

The genus *Philonthus* is one of the most numerous, both in species and individuals, of the larger *Brachelytra:* they occur in profusion in every heap of dung throughout the summer and autumn, preying voraciously on the *Aphodii* and other coprophagous genera, and apparently destroying more than they require for food,

* Since writing this I have seen Mr. Curtis's beautiful figure: it appears that it has now been taken in many places; but it is to be regretted that Mr. Curtis should have selected it as an example of *Quedius*, since, even if we reject the genus *Microsaurus*, its figure differs considerably from that of the typical *Quedii*.

as I have often found ants carrying off the mutilated bodies of small *Aphodii*, nearly or quite severed, at the junction of the thorax and elytra, as if by the bite of *Ph. splendens*, or some one of the larger species, but otherwise untouched. The mention of ants in this place recalls to my mind a curious scene which I witnessed in the summer of 1833, near Sydenham, in Devonshire: a number of the large *horse-ant*, (I do not know the scientific name,) common in the west of England, were passing along the top bar of a gate, and in the midst of the procession appeared two or three ants carrying between them a living *Philonthus politus*, whose struggles for liberty appeared utterly fruitless; for what purpose he was thus secured, or how the ants had succeeded in capturing an insect so well provided with means both of defence and escape, I had no means of ascertaining.

Some of the *Philonthi* are variegated with lively colours on the elytra, and nearly all the species are distinguished by the brilliant metallic polish of the head and thorax: they are active and lively insects, running with great rapidity, and flying well, mostly in sunshine. Some of the pilose species are infested by *Acari*. They all appear to be gregarious, and the different species are found together: the larvæ are equally predacious with the parent insects, which they greatly resemble in general form: that of *Ph. politus* has been figured by Mr. Westwood, in the Zool. Journal, vol. iii. pl. 2.

The two first species, *Ph. laminatus* and *Ph. æneus*, are considered by Mr. Stephens to be probably the two sexes of the same species; the only difference I have been able to detect is that *Ph. æneus* is usually a trifle larger, and wants the prolongation, observable in the other, of the ante-penultimate abdominal segment:—*Ph. chalceus* is also placed within brackets in the "Systematic Catalogue" as a possible variety of the same species; but this I think is distinct: though nowhere common, I have taken it in Gloucestershire, Lancashire, and Cornwall. It is a smaller and more compact looking insect than the other, with the thorax rather more convex, and the sides of the head and thorax rounder; and, when alive, the head and thorax show a rich rosy-copper gloss, not observable in the other.

I have a variety of *Ph. splendens* in which the head and thorax are glossed with rich steel blue instead of copper, and another in which the disk of the elytra is piceo-ferruginous, probably from injury in the pupa, as the insect appears fully mature. The number of thoracic punctures also in each series, on which Mr. Stephens has founded his sub-divisions of the genus, sometimes varies

in an anomalous manner: for instance, in a specimen of *Ph. politus* in my cabinet, instead of a double quadripunctate series, there are six punctures on one side, and only two on the other. I have an extraordinary monstrosity of this last species, with a raised tubercle in the centre of each elytron: this insect, which I took in Gloucestershire, stood for some time in my cabinet as a new species by the name of *Ph. micropennis;* but on showing it to Mr. Stephens, he pronounced it merely a variety of *Ph. politus.*

Most of the localities which I possess of this genus have been already given in my catalogue of the Penzance *Coleoptera:* I shall here therefore only remark that the species with spotted elytra, (*Ph. lituratus* and its allies,) which do not usually make their appearance in the midland counties till the middle of August, are found in abundance near Penzance in June: the mildness of the climate in Cornwall probably occasioning their earlier exclusion from the pupa. *Ph. bimaculatus* and *Ph. aciculatus* are much rarer than the other species of this section: the latter I have never taken; of the former I found a few specimens near Penzance, and in the autumn of 1835 I took in Christ Church Meadow, Oxford, an insect, pronounced a variety by Mr. Stephens, in which the elytra had no regular spot, but a strong gloss of dull red pervading the apical half in some lights.

Ph. micans, which Mr. Stephens notices as rare, is taken not uncommonly in Christ Church Meadow, Bagley Wood, and the neighbourhood of Oxford generally: some specimens greatly exceed the length of $2\frac{1}{2}$ lines assigned by Mr. Stephens.

The beautiful species comprised in the genus *Raphirus* bear so much greater affinity in habits and general appearance to *Quedius* than to *Philonthus,* that I am surprised the latter genus should have been interposed between them; for it appears to me that the chain of affinity in forms would be more obvious and complete, if the *Raphiri* were made the link between the smaller *Quedii* and the more slender species of *Philonthus,* as *Ph. marginatus, lituratus, micans,* &c., now placed at the end of the genus, while the species with broad heads, as *Ph. æratus, punctícollis, sericeus,* &c., would more naturally conduct to the *Bisnii, Cafii,* and other large headed genera arranged towards the end of the *Staphylinidæ:*— but this suggestion is made with all due deference and submission to the opinion of more scientific entomologists.*

The great attenuation of the abdomen, (resembling that of the

* The above was written before the appearance of Mr. Stephens's "Manual," in which *Raphirus* is placed between *Quedius* and *Philonthus.*

Tachypori, &c.,) and the changeable gloss of the pubescence, render this genus distinguishable at the first glance: none of the species appear to be numerous in individuals, and different specimens vary considerably in size and brilliancy: one of my specimens of *R. semiobscurus* is nearly $5\frac{1}{2}$ lines in length.

R. boops has been several times taken near Oxford by my friend A. Matthews, Esq.

R. rufipennis I took in the Scilly Islands, the only species of the genus which I found there during my short stay: the golden gloss of the pubescence gave the insect a most beautiful appearance when alive.

R. semiæneus I have taken in Gloucestershire, and I think in Cornwall also, but I do not find it in my local catalogue.

The *Bisnii*, though found, as remarked by Mr. Stephens, as well under dung as under fuci, seem never to occur at any distance from the coast: I never took a single specimen inland. *B. cephalotes* I found in considerable plenty at Southend, in July last.

The different species of *Cafius* occur in great plenty under sea-weed, in all parts of the coast, but are so exclusively maritime in their locality that I never saw a single one beyond the limits of the sea-beach. They are highly predacious, and are well fitted for rapine by their broad heads and long jaws armed with powerful dentations: on turning up a heap of sea-weed, they may frequently be seen, particularly when the sun shines, to spring into the air after the flies thus disturbed, aiding their dart by a momentary expansion of the wings. Their voracity does not even spare their own species: the larger specimens prey on the smaller without mercy, and I have seen two leave a common prey untouched while they fought for its exclusive possession. They burrow with great agility under the loose sand when alarmed, their flattened body, and expanded and pilose anterior tarsi, being admirably adapted for making their way through this loose material: though they frequently content themselves with merely thrusting their heads under a pebble and remaining motionless, apparently thinking, as popular belief attributes to the ostrich, that they are thus effectually concealed.

The distinguishing characteristics of the different species in this genus have somewhat perplexed me, from the great variation observable in different specimens: the first species, *C. fucicola*, I have never been able satisfactorily to identify among my specimens: and I have sometimes doubted whether the two next, *C. xantholoma* and *C. lateralis*, might not in reality form a single

species, as the anterior puncture in the thoracic series, which is one of the distinctive characters insisted on by Mr. Stephens, varies so much in size and position as to be but a doubtful criterion: and of the frontal punctures on the head, the apparent presence or absence of the external one seems to me to depend on the greater or less elevation of the scape of the antenna, which, when it stands out much in relief, as it does in some specimens, gives the appearance of a large puncture or foveola on the inner side; while in others it scarcely rises above the level of the head. The general dimensions, and the relative proportions of the heads and mandibles, vary in different individuals as much as they do in *Creophilus maxillosus:* and it is possible that all my specimens may truly belong to one species, and that I may not yet have seen an authentic specimen of the other.

The two other supposed species, *C. littoralis* and *tessellatus*, are certainly mere immature varieties, as Mr. Stephens has placed them in the "Illustrations:" I have observed them in all the intermediate stages of colour: and should my preceding views as to the identity of *C. xantholoma* and *lateralis* prove correct, I suspect that the former, from the general darker colour and obsolete pubescence, will be found to be the old specimens.

Of the *Gabrii* I have only to add a locality for *G. pallipes*, which is common in Christ Church meadow, and elsewhere, near Oxford. A. Matthews, Esq., lately informed me that he has detected an entirely new form, which will take its station near *Gabrius*, but differs in having the tarsi greatly dilated, and in other characters: but I have not seen the insect.

The larger *Gyrohypni* appear to affect by preference maritime situations: even the commonest species, *G. cruentatus*, does not occur in any great numbers inland, while on the shores of Mount's Bay I found it swarming under horsedung on the beach, and decidedly more common than any other of the large or middling sized *Brachelytra:* it occurred in equal profusion at Ryde, Weymouth, and Portland Island: in the Scilly Islands I did not meet with it, but I should feel little doubt of its occurring there. The Cornish specimens of *G. tricolor* almost equalled the above-mentioned species in size.

Mr. Curtis, in the late volume of the British Entomology, has figured the supposed variety of *Lathrobium quadratum*, with a red dot at the apex of the elytra, as a species, by the name of *L. terminatum*, of Gravenhorst, indicating it, however, as probably only a variety of *L. quadratum.* I never took this insect myself, but Andrew Matthews, Esq., who takes it in considerable numbers at

Weston-on-the-green, tells me that he has no doubt of its being merely a variety of *L. quadratum*, both insects occurring together in the same situations and in nearly equal numbers, and never being found separately. May not the dot be a sexual distinction? The dotted specimens given me by Mr. Matthews appear a trifle broader than the undotted ones taken by myself.

The following species of this genus, indicated by Mr. Stephens as among the less common, are found in Christ Church Meadow, and elsewhere, near Oxford: *L. punctulatum*, *longulum* (rather common), and *fovulum*.

I have never seen any notice of the singular manner in which the common little species *Astenus angustatus* carries its antennæ in running: they are bent almost into a semicircle, the tips almost touching each other, and incessantly vibrating as in the *Ichneumon* tribe: I have not noticed this peculiarity in any of the neighbouring genera.

I have seen some specimens of *Pæderus littoralis* in which the mandibles were piceous instead of red, probably old insects: it may always however be recognized by its more slender figure, smaller head, and oblong thorax, as well as by its somewhat brighter colouring, from its nearly allied congener *P. riparius*. In habits also it appears to present some difference, as I found it in Cornwall running on the stems and leaves of osiers, &c. in considerable numbers, whereas *P. riparius* is seldom found except on the ground. I have a specimen, apparently belonging to *P. riparius*, but so nearly intermediate in form, colour, and proportions, that I was for some time puzzled where to place it.

Of the rare and elegant *P. fuscipes* I took a single specimen, in August 1835, on the sands near Ryde, in company with *riparius* (not *littoralis*), but the difference in habit and general aspect was obvious at a glance. I never met with either *P. ruficollis* or *P. sanguinicollis* in England: but I have received several specimens, agreeing closely with Mr. Stephens's description of the latter, from Denmark and Norway, by the name of *P. collaris*: one specimen was marked Kiel, and I believe it is common in Sweden. I may mention that I have often seen the *Pæderi* engaged in wiping the palpi, inside of the mandibles, base of the antennæ, &c. with the claws and dilated tarsi of the fore feet, with as scrupulous care as a cat washes her face: I have also seen *Staphylinus erythropterus* similarly employed.

The determination of specific titles in the genus *Stenus* is nearly as difficult as among the *Aleocharæ*, from the great number of species, and their general similarity of colouring. Most of them

are gregarious: *St. nigriclavis, rufitarsis,* &c. are found in great numbers in winter, collected together in loose earth at the roots of trees in Christ Church meadow.

Stenus flavipes, St. pubescens, and *St. Kirbii,* are taken by Mr. Matthews at Weston-on-the-green: the last named species I myself took at Southend and Sheerness last summer; when I had an opportunity of verifying a fact mentioned in the "Entom. Edin." on the authority of Mr. Bainbridge, that "individuals thrown on the water dart like *Velia* or *Gerris* eighteen or twenty inches along the surface," a mode of escape which I saw *St. Kirbii* voluntarily have recourse to.

The following of the less common species I have taken in Gloucestershire and Oxfordshire: *geniculatus, lineatulus* (not uncommon), *buphthalmus* (here less common than the preceding), *cicindeloides, unicolor* (not common), *similis,* and *picipes. S. biguttatus* is also taken at Weston by Mr. Matthews.

On the succeeding genera of the *Stenidæ* I can only add a locality or two; but I cannot omit to notice the inveterate misspelling which has [much] obtained in this country of the name of Mannerheim's genus *Platystethus,* which, in defiance of its obvious derivation, πλατυς, broad, στηθος, breast or thorax, seems to have naturalized itself in England as *Platysthetus,* a name expressing nothing in Greek, or, as far as I am aware, in any other language: the universal adoption of this error is really a slur on the classical knowledge of [some of] our Entomologists.

Pl. immunis, and *Pl. foveatus,* occur in autumn in Gloucestershire.

Pl. pallidipennis is taken by Mr. Matthews at Weston-on-the-Green: in recent specimens the pale part of the elytra is nearly white, and its boundary well defined; the shoulder is always dusky, joining the other colour in a diagonal line: in old specimens there is only an indistinct pale patch in the middle of the elytron, surrounded on all sides by dark piceous.

Oxytelus picipennis is not uncommon in Gloucestershire.

Mr. Stephens speaks of the *Platystethi* and *Oxyteli* as occurring "at all times, especially in the spring and early summer months:" it would appear that their exclusion from the pupa takes place about the beginning of autumn, as they make their appearance in dung in multitudes towards the end of September, when the numbers of the *Philonthi* begin to diminish; they are the latest of all coprophagous *Coleoptera* to disappear at the approach of winter, and the earliest in their re-appearance in

spring, except perhaps *Aphodius testudinarius:* from June to September they are seldom seen.

Trogophlæus arcuatus occurs near Oxford, and I believe others of the genus, but many of my specimens are yet unnamed.

Evæsthetus scaber is found near Oxford, but not common; my specimens are not black as described by Mr. Stephens, but rather testaceous brown with glossy black elytra.

Lesteva impressa is taken by Mr. Matthews at Weston: the specimens vary much in intensity of colour, from brown or pitchy black to dull testaceous yellow.

Since the above notes were written, some additional remarks have occurred to me, which I shall here append.

Many supposed species have been reduced in Mr. Stephens's new "Manual" to the rank of varieties: and an inspection of the original specimens on which many of the species were founded, in Mr. Kirby's collection now possessed by the Entomological Society, convinces me that this reduction requires to be still further extended. Many of these typical specimens are obviously only immature states of well known species; but the notes which I made on this point were unluckily lost. *Gabrius ventralis* I however remember is an immature specimen of one of the common species, with the segments of the abdomen much extended in setting.

Quedius atriceps, *Q. Lathburii*, and *Q. inquinatus*, have occurred near Oxford.

Raphirus nigricornis mihi. Length barely two lines; antennæ rather thickened, black; head and thorax shining glossy black; head suborbiculate; thorax with two punctures placed obliquely on each side the disk, and a few others, connected together, close to the outer margin; elytra pubescent, pitchy brassy-black, the apex reddish; abdomen pilose, obscure black, edges of the segments reddish, and of the penultimate one white; legs black; tarsi piceous. This appears to be distinguished by the colour of the legs and antennæ from all others of the genus, except perhaps *R. fuscipes*, which differs in size and other particulars.

Philonthus cyanipennis. I purchased a pair of insects which appear to correspond with this species at Mr. Swainson's sale, on which the habitat was marked New York. Dr. Leach's only specimen was taken near Swansea, and the examples in the British Museum are from France and Switzerland.

Philonthus coruscus. In his description of this species, Mr. Stephens omits to notice that the scutellum, suture, and base of the elytra narrowly, are brassy black; and the occurrence of these distinctions in the specimens which I took in Scilly, led me to doubt whether my insects might not be distinct, till I ascertained their identity by comparison with Mr. Kirby's specimens.

Gabrius villosulus has occurred near Meysey Hampton in Gloucestershire, where I have also taken *Gyrohypnus tricolor* of even larger size than the Cornish specimens.

I find that I was wrong in supposing that Mr. Rudd had taken the insect which I characterized in the Ent. Trans. ii. 64, as *Remus sericeus*, on the coast of Yorkshire: his specimens were from the Isle of Wight, and I am indebted to him for the knowledge of a sexual distinction—the male having the last abdominal segment notched beneath. Mr. Shuckard (Elements of Entomology, i. 110) considers that it "differs too slightly from *Cafius* to constitute a distinct genus;" and with *Cafius* he accordingly places it: but independent of the differences in the trophi, &c., I think the contrast between the polished thorax of *Cafius* with its double row of large punctures, and the closely punctured one of *Remus* with its dorsal callus, too great to admit of their being placed together: and Mr. Stephens (in the "Manual") has sanctioned its establishment as a genus, placing it between *Heterothops* and *Othius*. Mr. Rudd had distinguished the specimens which he placed in the British Museum by the MS. name of *Menapius grisescens*.

I have noticed that most of the *Lathrobia*, in alarm or death, double the long flexible end of the abdomen *under* the body instead of *over* it.

Omalium mesomelas mihi. Size and dimensions of *O. sordidum*, of which it may possibly be a very high coloured variety; bright rufous; head black; disk of elytra suffused with deep cyaneous. It resembles in colour *O. iopterum*, but is a much wider insect. Near Meysey Hampton, Gloucestershire, in a rotten oak-stump, Sept. 1838.

XIX.—*Observations respecting various Insects which at different times have afforded Food to Man. By the* Rev. F. W. Hope, F.R.S. &c.

[Read 4th December, 1837.]

I think it necessary to state at the commencement of this paper, that I confine my inquiries at present solely to insects, passing by the *Crustacea*.* It will, no doubt, after an investigation be generally admitted, that insects in very early days were eaten as an article of food; as it may however be doubted by some individuals, it will be better to clear up this point before we enter more minutely into the main object of our inquiry.

Perhaps the earliest account we have of edible insects is that which is mentioned by Moses, the Jewish lawgiver, where insects are noticed in the catalogue of animals permitted for food, (vide Lev. xi. 21, 22), "These ye may eat, the locust after his kind, and the bald locust after his kind, and the beetle after his kind, and the grasshopper after his kind." Without attempting at present fully to explain this passage, which has afforded ample matter for discussion to the commentator as well as the naturalist, I merely remark in alluding to it, first, that at the time the above passage was written, it may fairly be inferred that locusts had long been eaten as food; and secondly, that in defining the different kinds, the object might be partly to deter the Jews from eating other *insects*, which experience had proved to be injurious, while the locusts, which were a wholesome food, might be eaten with impunity, and therefore were they more especially recommended to notice. The next authority I have to advance in support of insects eaten as food, is that of Herodotus, the father of history. Speaking of the Nasamones he states, they regaled on locusts. The translation of the passage is as follows: "They hunt for locusts, which having dried in the sun, they reduce to powder and eat, mingled with milk." vid. Herod. Melpomene, chap. 72.

Diodorus Siculus also mentions a race of Ethiopians who were so fond of eating this food, that they were called acridophagi, or locust eaters (vid. lib. 24, ch. 3). Instead of bringing forward at present a cloud of witnesses of ancient as well as modern

* An account of the different edible species of *Crustacea* may at some future period be added to the present, should such a memoir be thought worthy the attention of the Society.

writers in attesting the well-authenticated fact of locusts eaten as food, I shall merely insert in tables at the end of this paper the names of different nations and people mentioned as feeding on such diet, and cite the several authors who have recorded them.

Before investigating the genera and species which have severally ministered to the wants of the wild African and Australian bushman, or to the luxurious Roman or more modern Epicurean, it may here be stated, that almost all the insects alluded to live on vegetable matter; some on the outer bark, a greater portion on the saccharine alburnum, the pith and inner coatings of trees, while a great number of others thrive on leaves, twigs, and the delicate fibrous roots buried beneath the soil. It appears then from the above brief statement, that insects live on cleanly diet, and consequently afford us more wholesome food than some of the animals that are usually served at our tables. It is not my intention here to recommend insectal food to nations living in northern climates, although I am aware that there are naturalists who have done so; the supply in summer accidentally might be abundant, but in winter certainly always must be scanty and precarious. I see no reason, however, why in the warm and well wooded regions of the world they should not be eaten, as the supply there is generally abundant. The New Hollander, or even the European settler in those parts, may derive much benefit by adopting the larvæ of insects as food, for the very worms regaled on, if left to themselves, in time might multiply so as to endanger the crops of future years, entailing ruin on the grower, and perhaps famine on the settlement. In case of scarcity in our own country, and certainly in milder regions of the world where famine has been known to spread over the land, insectal food may be adopted. It is probable that want and hunger may have been the original cause of introducing to notice several of the insects which have been taken as food, although I am unable at present to adduce any particular instance to substantiate the fact. Insectal food, which I here recommend in case of necessity, will certainly not be so revolting to man as the animal gelatine of pulverised old bones, or even as insipid as sawdust bread, recommended by the French in similar emergencies.

To proceed, however, it is time to investigate the species of insects which have been eaten at different times. I shall commence with the *Coleoptera*, and run through the remaining orders, explaining, as far as is possible, the genera and species to which they may belong.

Scarabæus sacer, Linn.

The first insect to which I shall direct your attention is the *Scarabæus sacer*, which is frequently eaten at the present day by Egyptian women, in order that they may become prolific, (vid. Dr. Clarke's Travels, vol. iv. ch. 1, p. 9), where it is denominated *Sc. pilularius*, or rolling beetle. The same he mentions is often met with sculptured on the obelisks and other monuments of the country. The above writer observes, but I know not on what authority, that this beetle served as food for the Ibis, and its remains are sometimes met with in the earthenware repositories of the embalmed birds which are found at Saccara and Thebes. Lane, in his account of the modern Egyptians, corroborates the testimony of Dr. Clarke. He states, "that the Egyptian women generally make use of perfumes, such as musk and civet, &c. and often of cosmetics, and of several preparations which they eat and drink, with the view of acquiring what they call a proper degree of plumpness. One of the preparations is extremely disgusting, being chiefly composed of *mashed beetles*." In a note appended to the above passage (vid. vol. i. p. 237), Lane argues, that these insects were eaten by the Jews (see Levit. xi. 21, 22), "Of these ye may eat, the beetle after his kind; but we cannot suppose that they derived this custom from the Egyptians, who regarded the beetle as sacred." In our translation of the Bible, the Hebrew word chargol is rendered beetle, which ought to have been rendered locust, vid. Bochart in loc. In another passage, in a note, the same author states, "Some women add another ingredient, but for a particular purpose, which is to make them fat; they broil and mash up a number of beetles in the butter, and then add honey," &c.

Lepidiota, Kirby.

Lep. Hypoleuca, Wiedemann. Wiedemann mentions that he found on the waron tree, in the Island of Java, *Melolontha Hypoleuca* in great abundance. This species is as common there as *Mel. vulgaris* is in Europe. He adds, the inhabitants of the mountains collect them as an article of food. Vid. Westermann and Wiedemann in Germar's Magazine, vol. iv. 419.

Rhisotrogus Pini.

The inhabitants of Moldavia and Wallachia are mentioned in some authors as eating the larvæ and perfect insects of *Rhisotro-*

gus Pini: the author's name I have unfortunately omitted to transcribe.

Anophlognathus viridiæneus.

Mr. William Sharpe Mac Leay has stated, in the "Horæ Entomologicæ," that he is inclined to think that the larvæ of *Anophlognathidæ* are the grubs which the New Hollanders use as an article of food;* in corroboration of this opinion, I can add the testimony of an individual who resided some years back in different parts of Australia, who assured me that the white grubs † which are eaten turned into golden beetles, and pointed them out in the box of insects which he had to dispose of. The species alluded to was *Anophlognathus viridiæneus*, and there can be little doubt that the white grubs of various other species are often mistaken for them and eaten. Should this opinion be further substantiated, and the food prove palateable and wholesome, the settler, from policy, should patronize as food these dainties which are so highly prized by the wild Australian, and thereby secure the crops of future years by feeding on the insects capable of destroying them; and certainly no reason can be adduced why the grubs of New Holland may not rival in delicacy the palm-worm of the Eastern world, or the cossus of Europe, which the Roman epicure, in the days of Pliny, so highly esteemed.

Oryctes Owariensis.

Another insect which is eaten at the present day is a species of *Oryctes*, named *Owariensis* by Palisot Beauvois. It is eaten by the nations inhabiting Cape Coast, and there can be little doubt that many other species of this genus, as well as of *Xylotrupes*, may be eaten with impunity. It is not improbable that Reaumur was aware of a species of *Oryctes* being eaten by the Africans, since he recommends the larvæ of *Oryctes Nasicornis* of Europe to especial notice. My gallant friend, Captain Downes, a resident some years at Fernando Po, who, although unable to specify the insect, mentions that at Sierra Leone the natives roasted and ate a palm-tree worm. He informs me also, that beetles and their larvæ are eaten on various parts of the western coast of Africa.

* Mr. Cunningham states, "Our wood grub is a long soft thick worm, much relished by the natives, who have a wonderful tact in knowing what part of the tree to dig into for it, when they quickly pull it out, and gobble it up with as much relish as an English epicure would an oyster."

† Vide Two Years in New South Wales, by P. Cunningham, vol. i. p. 329.

Lucanus cervus.

Scopoli records his opinion, that the larva of *Lucanus cervus* was probably the *Cossus* of Pliny, and it seems probable that this opinion was correct.

Tenebrio, Fabricius.

The celebrated Niebhur states in his travels, that the women of Arabia and Turkey make use of a species of *Tenebrio*, which is found amongst the rubbish of their gardens. As plumpness is thought a beauty in the east, the women, in order to obtain this beauty, swallow every morning and every evening three of these *Tenebriones* fried in butter.—Vid. Niebhur's Travels, vol. ii. p. 339. It will perhaps be remarked, that the name of the species is not mentioned. I think it is likely that a *Pimelia* of the present day is intended, and not a *Tenebrio*. As the larvæ of *Tenebrionidæ*, commonly called meal-worms in England, chiefly live on flour, might they not in times of scarcity be resorted to? they abound in bakehouses and granaries, and often in our kitchens live under the hearth-stones. Lane distinctly states that true *Scarabæus* is eaten; probably, therefore, other genera and species are regaled on.

Prionus coriarius, Linn.

The larvæ of this insect, with those of *Lucanus cervus*, were eaten by the Romans under the name of *Cossus* (vid. Amoreux, p. 154), and if it is allowable to add other species which were probably confounded under the same name, I should mention *Hamaticherus heros*, *Lamia textor*, and *Morimus tristis*, all inhabiting southern Europe, and tolerably abundant in Italy at the present day.

Stenodontes Damicornis, Linn.

The larvæ of this beetle are eaten in Surinam, in America, and in the West Indies, both by white and black people. It is considered an exquisite relish, and is called by the natives the Macauco, or Macokko beetle. Linnæus, in his Mantissa Plantarum, published in 1771, gives us a short list of insects, where, under the name of the above species, he adds the following remark:—"Habitat in Jamaica, larvæ in obsoniis sapidæ."

Montac Beetle.

This is the larvæ of one of the *Prionidæ;* it is eaten at the Mauritius when dressed, and is named the Montac grub; the whites as well as the negroes eat it greedily. Vid. St. Pierre's Voyage.

Macrodontia cervicornis, Linn.

Linnæus, writing on this insect, states: "Habitat in America, ligno Bombacis larvæ quæ exemptæ edulis in deliciis."

Omacantha gigas, Fab.

According to Smeathman this insect, when roasted, forms an article of food in Africa.

Lamia rubus?

The larvæ of *Lamia rubus?* Fab. are eaten in the island of Ceylon, and I have heard also, that the Burmese are partial to these beetle grubs, probably a closely allied species of *Lamia*. One species I have seen, it appeared longer than *rubus*, but it was in too mutilated a state to speak with certainty. It may here be added, that under the name of *rubus* there are several species of *Lamia* confounded together.

Lama 8-*maculata*.

The above insect is reported to be eaten in India. Is this the destructive insect named *Carian* by Heyne, which he states is not so prejudicial to the cocoa-nut trees in the Mysore as it is on the coast? Before concluding with the *Longicornes* it may be mentioned, that many others of the *Prionidæ*, and *Lamiidæ* and *Cerambycidæ*, are probably eaten, and, from the account of various travellers, beetle grubs appear to be rich and delicate eating.

Calandra Chinensis?

The historian Ælian mentions the circumstance of an Indian king treating some of his Grecian guests with the larvæ of an insect instead of fruit. This probably was a grub of a species of *Calandra*, and not unlikely that of *Cal. Chinensis*, which is widely spread over a large portion of the Asiatic continent. It is abundant in China, on the Tanesserim Coast; at Calcutta, Ceylon, and also in the Concan.

Calandra palmarum.

This insect is also a species of palm-worm, but certainly distinct from that of India. It is called in the West Indies, where it abounds, *Grugru*. According to Madame Merian they are roasted

by the natives, and are esteemed, when properly cooked, rich and delicate eating. Linnæus also, in a remark relating to this species, adds, "Larvæ assatæ in deliciis habentur."—Vid. Linn. System. Nat. p. 606.

In terminating the Coleopteral order it may be here stated that there can be little doubt that various other species of grubs of the genus *Calandra* are eaten by different nations in the widely separated regions of the globe.

Orthoptera.

1. *Locusta migratoria*, Linn.

Locusts, as I have before stated, were eaten in the early stages of the world, and it is only by critical commentators that this point seems to have been disputed.

The well authenticated fact of various nations eating locusts as food, determines a question concerning which commentators on the Bible have long disputed, namely, whether the *Acrides* of John the Baptist were locusts according to the literal sense of the word, or whether ακριδες was a term given to the pods of a species of cassia. The first, in my humble opinion, is the only correct interpretation of the word. The hypercritic argues that locusts are an unnatural food, forgetting that they were allowed to be eaten by Moses, the Jewish lawgiver. Now, if they were eaten in early days, and are eaten at present by people frequenting the very same desert which John the Baptist inhabited, what reason have we to think that they were ever abandoned in his time? None whatever! Locusts will still continue to be eaten, and critics still endeavour to refine, but all their acumen and learning will never convert an insect to a fruit.

The first species I allude to is the *Locusta migratoria*, commonly eaten in the Crimea: it is often the precursor of *Loc. Tatarica*. Under the name of migratory locust, there are undoubtedly several species confounded. The trivial name of *migratoria* is characteristic of many of the species, and has probably been the cause of the confusion. Occasionally they visit various parts of Europe, and sometimes England, migrating chiefly from the Crimea.

2. *Locusta Tatarica*, Linn.

This insect is eaten commonly in the Crimea. When these animals arrive in swarms, the whole vegetable produce disappears. Nothing escapes them, from the leaves of the forest to the herbs

of the plain; fields, vineyards, gardens and pastures, every thing is laid waste; sometimes the only appearance left on the naked soil is a revolting heat caused by their putrifying bodies, the stench of which too often produces a devastating pestilence.

3. *The Muken, or Red Locust.*

I am in doubt what name to attribute to this species. The Egyptians and Arabians esteem it as the fattest and most delicate of the locusts.—Vid. Niebhur. At Bassorah, the Arabs call this locust, which they are extremely partial to, *Muken;* when fat and full of eggs it is esteemed a very strengthening food for men; the male *Muken* is lean, and therefore is not much eaten.

4. *The Light Locust.*

Another species eaten by the Arabians is called the light locust: it appears to be unknown to our European entomologists; this, when it arrives, is lean, and after it has lived well for a time is called the *Fat Locust.*

5. *The Dubbe Locust.*

This species is by no means in request in Arabia, and is scarcely deemed esculent, because it tends to produce diarrhœa. Rœsel tells us, that eating locusts is unwholesome, and produces winged dog lice, or dog flies. This opinion, however, is disputed, and is now not credited by travellers.

6. *Locusta gregaria*, (Forskal, Gerrard,) *or Red Skipper.*

This insect is considered as one of the most destructive to vegetation, and is most probably the *Acridium* of the ancients. An interesting account relating to this species will be found in Blaquiere's Travels. It is probably also the locust described by Belzoni, who says they devour every thing. The natives eat them fried; they are about two inches in length, and are generally of a yellow or gold colour, but there are some red, and some green.—Vid. Belzoni. Colour is no criterion of species with respect to this locust, and probably the remark will apply to others. When young it is green; as it grows it assumes a yellow hue, and lastly becomes brown and red. There is an indifferent drawing of one of the above insects in James Grey Jackson's Travels in Morocco. Vid. third edition (1816), p. 102.

7. *Locusta Cernensis*, Hope.

This species, which is apparently undescribed, is eaten by the natives of Madagascar, and preferred by them to their finest fish. Their method of dressing them is to strip off their legs and wings and fry them in oil. I have given it the name of *L. Cernensis*, derived from the ancient name of that island, which I prefer to *Madagascariensis*, used by French writers.

8. *Locusta devastator*, Lichtenstein.

This destructive insect is mentioned by Lichtenstein as devastating Southern Africa. They are greedily devoured by the Bosjesmans or Wood Hottentots, who, not content with catching them by handsful, dig long and deep trenches, and capture them by thousands. Adamson mentions, moreover, in his voyage that various tribes of Africa eat locusts.—Vid. p. 161.

9. *Locusta pupa*, Linn.

I have somewhere read (Rosenmüller?) that this species is eaten occasionally, but do not recollect the reference.

10. *Locusta cristata*, Linn.

Linnæus, in his "Systema Naturæ," under the name of *Locusta cristata*, mentions in a note that this species is eaten by the Arabs, "Hic Arabicus esculentus est."

There are different methods of preparing locusts. The Arabs throw them on the fire, and when sufficiently fried, they pluck off the legs and head, and eat the remainder. Some dry them in ovens, and others grind them to powder in handmills, or pound them in stone mortars; the powder is then mixed with water, and made into a cake, and baked as common bread. Others, again, boil and eat them with salt. The taste is compared to shrimps, and by Rosenmüller they are reported to be nearly the same in flavour as the smoked *Agaric* eaten in Holstein. Another authority for their peculiar flavour is "Joseph de S. Ange, de Toulouse, dans son Gazoph. Pers. sous le titre *Locusta*, raconte qu'en Arabie tout le monde (tutti quanti), pauvres et riches, mangent les sauterelles avec beaucoup de l'appetit, et qu'en effet elles sont bonnes (e che veramente sono buono), et ont le gout d'ecrevisses. D'autres disent qu'elles ont plutot le gout de hareng frais." —Vid. Scheuchzer, vol. ii. p. 111.

11. *Locusta viridissima.*

This species has occasionally been eaten. It is seldom found in great numbers, and is reported not to possess the flavour belonging to the migratorial species.

12. *Locusta Mahrattarum.*

When a cloud of locusts visit the Mahratta country, the common people salt and eat them; probably they have long been accustomed to such food; as it is evidently distinct from any African species, I suggest the name of *Locusta Mahrattarum.*

Meer Hassan Ali tells us, that the Mussulmauns in India eat locusts. Speaking of a cloud of them, he proceeds as follows: "The main body of the army of locusts must have occupied thirty minutes in passing over my head, but my attention was too deeply engrossed to afford me time to consult my watch; stragglers there were many, separated from the flight by noises made by the servants and people to deter them from settling, some were caught and were converted into currie for a Mussulmaun's meal. They say it is no common delicacy, and is ranked among the allowed animal food."—Vid. Meer Hassan Ali's History of the Mussulmauns, p. 165.

As I have heard Englishmen who have been in the East Indies state that the natives of India do not eat locusts, I quote another authority which speaks on the point generally without alluding to any particular species. Paxton gives us the following passage: "Many nations in the East, as the Indians in the Bushee Islands, the Tonquinese, and the inhabitants of Madagascar, make no scruple to eat locusts, of which they have innumerable swarms, and prefer them to their finest fish."—Vol. i. p. 327.

The next authority I quote of people eating locusts is Ludolphus; in his History of Ethiopia we find the following quaint passage: "The Habessines for sometime support themselves by feeding on locusts, which they greedely eit, as well to satisfie their hunger as in revenge, for it is a very sweet and wholesom sort of dyet, by means of which a certain Portuguez garrison in India, that was ready to yield for want of provision, held out till it was relieved another way; and therefore it is not to be doubted but that St. John the Baptist fed upon these locusts in the wilderness."—Vid. chap. 13, p. 67.

13. *Locusta Persarum*, Morier.

Morier informs us of a flight of locusts which visited Persia.

They were not, he says, of a predatory kind, and differed from the red locust which destroys vegetation; they were three inches long, the body and head were of a bright yellow. The Plain of Bushire was covered by the poorer inhabitants, men, women, and children, who came out to gather locusts, which they eat; they dry and salt them, and afterwards sell them in the bazaars as the food of the lowest peasantry: when boiled the yellow ones turn red; they eat like stale and decayed shrimps.

Forbes states in his Oriental Memoirs, "It is well known that locusts there are an article of food in Persia and Arabia at the present day; they are fried until their wings and legs fall off, and in that state are sold in the markets, and eaten with rice and dates, sometimes flavoured with salt and spices."—Vol. i. p. 82.

As to the modern Arabs, they eat locusts when fresh, and esteem them, when salted, a great delicacy; the flavour is similar to that of fried herrings, but more delicious.*—Vid. Horneman's Travels in Fez.

It would indeed be easy to multiply modern authorities respecting locustal food; one more authority shall suffice, from which it will appear that the Arabs make a sort of locust bread. Madden, in his interesting travels, tells us, "The Arabs make a sort of bread of locusts; they dry them and grind them to powder, then mix this powder with water, forming them into round cakes, which serve for bread."—Vid. vol. ii. pp. 31 and 218.

* Burkhardt more particularly details the method of dressing locusts in Arabia. "All the Bedouins of Arabia and the inhabitants of the towns of Nedgd and Hadjaz are accustomed to eat locusts. I have seen," he says, "at Medina and Tayf, locust shops, where these animals were sold by measure. In Egypt and Nubia they are only eaten by the poorest beggars. The Arabs, in preparing locusts as an article of food, throw them alive into boiling water with which a good deal of salt has been mixed, after a few minutes they are taken out and dried in the sun. The head, feet and wings are then torn off, the bodies are cleansed from the salt, and perfectly dried; afrer which process, whole sacks are filled with them by the Bedouins. They are sometimes eaten broiled in butter, and they often contribute materials for a breakfast, when spread over unleavened bread mixed with butter."—Vid. Burkhardt's Notes on the Bedouins and Wahatays, vol. ii. p. 91.

Salt also, in his voyage to Abyssinia, p. 172, writes as follows: "During our stay in this quarter a large flight of locusts came over to one of the islands, and in a few days destroyed nearly half the vegetation upon it, not sparing even the bitter leaves of the rack tree. These locusts are called Jarad in Yemen and Anne in Dankali, and are commonly used as food by the wandering tribes of both these nations, who, after boiling them, separate the heads from the bodies, and devour the latter in the same manner as Europeans eat shrimps and prawns."—Vid. Salt's Voyage to Abyssinia, p. 172.

14. *Locusta Onos*, Pallas.

The celebrated traveller Pallas, in the fourth volume of his Voyages, in the Appendix, informs us that *Gryllus Onos* is eaten by the Mongols and other Indians, "Mongolia insectum, Sinensibus edule."—Vid. p. 678. The description of the species is more fully detailed in his Spicilegiorum Zoolog. fasicul. 9, p. 17, where there is an exact figure, vid. table 2, fig. 1.

15. *Acheta Smeathmanni.*

From the information furnished to Mr. Drury by Mr. Smeathman, we learn that the children in Africa are, at the proper season, very busily employed digging out of the ground the females, when full of eggs, of a species exactly resembling *Acheta membranacea* of Drury, on which they make an agreeable repast, roasting generally the whole animal, but eating only the eggs, which are contained in a bag—they resemble part of the roe of the fish—deeming it very delicate food.—Vid. Westwood's Edition of Drury's Exotic Insects, vol. ii. p. 91.

A species closely allied to the above ravaged the Burmese territories, and was eaten, I understand, by the people there, after roasting them.

Before concluding my observations on locustal food, I think I may here be allowed to suggest some methods calculated to counteract and mitigate the injurious effects they too often occasion. First then, the legislative powers in the countries where the locusts abound, should recommend them generally as an article of food; more effectual means, however, would be to employ the people and children in hunting for their nests and eggs, which they might in a great degree destroy; when the young make their appearance, they may be employed again, and if the insects prove too abundant for them, the police and military of the district should be called in to aid in the work of their destruction. On the arrival of overwhelming swarms, when famine is likely to be caused by their devastation, I would recommend a levée-en-masse of the population to sally forth and collect them by thousands: as many as may be required for food may be prepared for future use, the rest should be buried in deep trenches. To attain this end, a poll tax of a bushel of locusts (or any other measure deemed advisable), might be required from each inmate of a house, and thus, by considerably reducing their numbers, future famine and pestilence (too often the sad effects of their visitations), might in some

instances undoubtedly be prevented. In alluding at present more particularly to one country, namely, the Crimea, I think that some good might there be effected; the descriptions relating to the sufferings of those people by the desolating armies of locusts are harrowing to read, and must excite the attention of the philanthropist as well as of the naturalist.

That unfortunate country almost annually suffers from this dreadful scourge, which devastates their lands; and when we consider it is not merely the yearly crops of corn and pasturage, but all that can be denominated vegetation, which is annihilated,—that it is not the whole crops of one year's growth only, but that of several succeeding years rendered comparatively unproductive by their attacks,—I cannot but repeat again the above recommendation of a levée-en-masse, and I am sure it will not be deemed preposterous when the result must prove decidedly beneficial.

Hemiptera.

1. *Tettigonia Antiquorum.*

Tettigonia, *Tettigometra*, *Tettix*, and *Cicada*. Under these several names in the different stages which this insect passes through, we learn that it was eaten by the Greeks; as it is probably unrecognized by moderns, I give it the provisional name of *T. Antiquorum*.

2. *Tettigonia Parthorum.*

According to Pliny, the Parthians regaled on a species of *Tettigonia;* I merely add a specific name to distinguish it from any that possibly were eaten as food in Greece.

3. *Tettigonia Septendecim.*

A species to which the above name is given is eaten by the American Indians at the present day, who pluck off the wings and boil them.

3. *Tettigonia Bennetii*, Hope.

Mr. George Bennett, in his Wanderings in New South Wales, states that the Aborigines used as food the *Tettigonia* or *Frog-hoppers*, which they call *Galang*, first stripping them of their wings; as the species is apparently unnamed, I have added that name, *Bennetii*, in honour of that enterprising traveller.

I now proceed with the remaining orders, first having combated an objection raised against locusts eaten in India. My sole authority was that of Major Moore, mentioned by Messrs. Kirby and Spence, in their Entomology; that authority has been questioned. From inquiries made of my friends, Colonel Burke and Major Robinson, officers well acquainted with India, I have since been informed, that it is no unusual custom of the Sepoys to make a locust curry; both the above individuals have at times tasted them, and describe them as little adapted to an European palate. Another authority is a communication received from my friend E. T. Downes, Esq., I give an extract of the letter sent to me: "Respecting your Entomological inquiry, I do not think that natives of any cast eat any insect save the locust, which they make into a curry. The Kunjars and no caste Hindoos eat the flesh of the gosamp, and a lizard called the *Sanne*, but I have never heard of them eating any insect besides the locust." From the same authority I also state, that in 1833, at Allahabad, an immense flight of locusts fell at that station; they were collected by the natives and eaten as curry when they wanted them: they were collected in earthen vessels, in which they were kept ready for use.

Lepidoptera.

1. *Larvæ of Papilionidæ.*

In this order I am able to add little additional matter, except that which may be gathered from the mine of information, the invaluable "Introduction to Entomology." Sparrman mentions, that the caterpillars of some of the *Papilionidæ* are eaten by the Bosjemans. Lander also, in the records of Clapperton's last expedition to Africa, in speaking of the food of the Yaribeans, mentions Elio, a celebrated fat eunuch, who held some of the highest offices of state under a black majesty. "He came to me," says Lander, "paunch and all, and boasted that he could procure any delicacy he might want, for he had only to hint his wishes, when a bowl of dogs' or asses' flesh, *a dish of fried caterpillars*, or *a saucepan of ants or locusts* was smoking before him in a moment." In another page of the same work it is stated, "As with the ancient Romans, *caterpillars* are in very high estimation among the people of Yariba.—Vide vol. ii. pp. 201, 205.

2. *Sphinx Larvæ.*

According to Sir George Staunton, the Chinese eat the larvæ of a *Sphinx;* the species, I believe, still remains unknown.

3. *Cossus ligniperda.*

Two celebrated naturalists, Ray and Linnæus, suppose the caterpillar of *Cossus ligniperda*, to be the identical *Cossus* which, in Pliny's time, delighted the Roman epicures.

4. *Bombyx mori.*

The Chinese, when they have unwound the cocoons of the celebrated silk-worm moth, serve up the chrysalides at table, taking care to retain a sufficient number for propagating the species. Tachsius informs us also, that the *Bombyces* were eaten as food ;* while Schrœder says, that they were dried or reduced to powder, and administered as medicine, in order to cure vertigo and convulsions, vid. Pharmacop. Medico-Chym. lib. v. p. 883. I add another authority, in corroboration of the above remarks. Mr. Favand, a missionary in China, states, that during his long residence in that country, "he has often seen the *chrysalides* of silk-worms used as food. He has himself partaken of them, and found them at once strengthening and cooling. After having wound the silk off the cocoons, they are dried in the fryingpan, when the envelop will come off, and they appear like yellow masses, resembling the eggs of carp. They are fried in butter, lard, or oil, and moistened with broth. When they have been boiled in this for five minutes, they are stirred well, and crushed with a wooden spoon. The Mandarins and rich people add the yolk of eggs, in the proportion of one yolk to a hundred chrysalides. The poorer people are contented with salt, pepper, and vinegar, or, after stripping them, in cooking them with oil."

5. *Nycterobius MacLeayii.*

The natives of Australia eat the caterpillars of a singular species of moth, which are taken at night while feeding. The name of *Nycterobius* has been given to it by Mr. William Sharpe MacLeay.

6. *Euplœa hamata.*

The Aborigines of Australia congregate together in the months of November, December, and January, in order to collect a species of moth which they call *Bugong*. The bodies of these

* "Non vestimentis modo, sed et aliis, Bombyces inservire usibus, certissimum. Pro cibo nonnullis fuisse Sachseus Gammarol. lib. 1, tradidit, et vivos eos virum quendam sanitatis ergo deglutuisse retulis Borellus, Hist. et Obser. Var. Medico-Phys. Cent. 3."

insects are large, and contain a quantity of oil, resembling in taste a sweet nut; they are sought after as a luscious and fattening food, and from various accounts, these bugong moths appear to be more prized by the Australian than any sort of food whatever.

Hymenoptera.

It is reported of the inhabitants of Cumana that, along with other insects, they were accustomed to eat bees. Knox asserts, in his history of Ceylon, that they are also eaten in that island; and from the description of the latter writer, the bees in question probably belonged to the genera *Xylocopa* or *Bombus*. Among the social insects we also find bees and ants, which at times have afforded food and sustenance to man; and the above writer tells us, "When the natives meet with any swarms of bees hanging on trees, they hold torches under them to make them drop, and so catch them and carry them home; they boil and eat them, esteeming them excellent food."—Vid. Knox's Ceylon, 1817.

Apis Mellifica.

Dr. Halley, in the "Miscellanea Curiosa," informs us, that the Moors esteem honey a wholesome breakfast, and he adds, "and the most delicious is that which is in the comb, with the young bees in it, before they come out of their cases, whilst they still look milk white, and resemble (being taken out) gentles such as fishers use; these I have often eat of, but they seemed insipid to my palate, and sometimes I found they gave me the heartburn." The above author elsewhere speaks also of Moors eating the young bees as an usual custom.—Vid. Philosop. Trans. and Miscell. Curiosa, vol. iii. page 382.

Ants.

Pinto makes mention of a sect of people who were accustomed to eat ants of various kinds. Piso gives us the names of two species inhabiting South America, which are in great request there, and the latter authority is corroborated by the celebrated Humboldt. Mr. Consett, in his Travels in Sweden, asserts, that in that country, "ants are distilled along with rye, in order to give a flavour to the spirits in use among the people, and there can be little doubt that formic acid is likely to be found far less injurious than the vitriolic acid, with which the gin of this country is so copiously adulterated." Another authority is Caldclengh,

who, in his travels, states, that at St. Paul's, in the Brazils, there is a species of large ant, which when fried, forms a food by no means contemptible in the eyes of the inhabitants. Richard Lander, in speaking of the food of the Yaribeans, mentions that they eat *black ants** just as they are able to fly. "They are stewed," he says, "and eaten with yams and *tuah*, and are consumed by all ranks with the most astonishing avidity."—Vid. Lander's Records of Clapperton's Last Voyage, page 205.

By Callaway it is stated, "Swarms of ants are abundant in Ceylon. The Sepoys attract them by burning a torch, which, scorching their wings, they drop to the ground. After picking them up and frying them with rice, the mess is divided and sent round to their friends as a delicacy."†

Neuroptera.

The present order affords us little additional matter, and is confined entirely to the genus *Termes*, commonly known under the name of the white ants. They yield, however, an ample supply of food to various nations.

1. *Termes fatale.*

Lichtenstein informs us, that the *Termes fatale* is a very favourite food of the Bosjesmans or Wood Hottentots; and he particularly mentions their eggs, which are in very great repute.

2. *The Indian White Ant.*

In the East Indies, according to Smeathman, the natives eat the white ants, raw as well as boiled. They take them in great quantities, mixing them with flour into a sort of paste, which they sell to the poor at a reasonable rate. The Mahrattahs are reported to be extremely partial to them. Forbes, in his Oriental Memoirs, supports the authority of Smeathman. "He states that the white ant is about the size of a small grain of rice, has a white body, appearing like a maggot, and a very strong red head armed with a powerful forceps. It has four short legs. They are an article of food among some of the low caste in Mysore, and the Carnatic.—Vid. vol. i. page 232. Buchanan informs us

* Lieutenant H. Sayers (lately returned from Africa) informs me, that amongst many other delicate viands particularly prized by the natives in the vicinity of Sierra Leone, black ants are sought for and eaten with avidity.

‡ Vid. Callaway's Oriental Collections, 1834, p. 61.

also, that one common article of food among the Chensu Carira of India, is the white ant, commonly called *Termes*.

3. *Smeathman's Ant.*

Smeathman also tells us, that several African tribes eat white ants, roasted, boiled, and raw; and then adds his opinion, derived from personal observation, that the individuals living on them soon get into good condition, from feasting on this nutritious food.

4. *Termes arborum.*

Before concluding my remarks on the order *Neuroptera*, it may here be mentioned, that not only the insects themselves, but part of their domiciles, are sometimes taken, not as food, but as medicine. Koster informs us, that portions of the nest of the *Copim* (of a species named *Termes arborum*) is taken in the state of a solution in South America, in agueish disorders.—Vid. Koster's Travels, vol. ii. page 50. May we not here take a hint from the South American, and as we have not the *Termes*, why not try and ascertain if portions of the nests of our British ants are efficacious in checking the same complaint? It is worthy of remark, that the grand specific for ague is bark and sulphuric acid, in short, quinine. Whence, I ask, originated this specific? probably it originated in the very country which gives us the Peruvian bark. What then is quinine? it is a remedy attempted to be assimilated to that of *Copim*. The next question that arises is, what is *Copim?* as far as is known, it appears to be an extract of wood acted upon by termitic acid. What is quinine? nothing more than bark acted on by sulphuric acid, and made more efficacious by that acid. I throw out these remarks purposely to promote inquiry, and I take the present opportunity of stating, that *Copim* appears to me to contain the concentrated virtues of the tree on which the insects feed; and I have little doubt, that insects may eventually afford us medicines more powerful than those of trees and plants, and certainly less deleterious than those derived from minerals.

Diptera.

In Pinto's Voyage there is a notice of a sect of people who used flies as an article of food. Scopoli, in his "Entomologia," mentions the larvæ of *Musca putris* as a dainty. The jumping maggots frequently met with in old cheese, turn to a fly denomi-

nated by Mr. Kirby *Tyrophagus caseus*. Cheese lovers are particularly partial to cheese attacked by them; and I have heard it asserted by such persons, that flies never attack a poor cheese.

Since this paper was read, I have received an anonymous note from some kind Entomologist, with a valuable reference, which I take the liberty of adding, and at the same time beg leave to thank the nameless individual for his communication.

In Arundel's discoveries in Asia Minor, there is a remarkable passage attesting the utility of the levée-en-masse, when called out to destroy locusts.

"In May 8th, 1827.—Left Bainder at seven o'clock, accompanied by all the great Turks, and armed from head to foot with muskets, pistols, and yatagans, in grand procession, to exterminate the locusts. I was awoke at a very early hour by the Turkish tambour, which was beating a summons for the entire population, Turk, Christian, and Jew, to rise en masse and sally out to destroy these destructive insects; arrived on the field of action about eight o'clock, the hedges were darkened by the masses of locusts, though not of more advanced growth than a large fly. Hundreds of people were to be seen, Turks, Jews, Greeks, and Armenians, grouped in all directions, brushing the locusts together in immense heaps with bushes, &c. at the beat of the tambour, and then with a thundering hurrah jumping upon the heaps and killing them. Other parties took a different mode by sweeping the masses into a small stream, where, like immense swarms of bees clustered together, they sank to the bottom."—Vid. vol. ii. p. 290, Discoveries in Asia Minor, by F. V. J. Arundel, British Chaplain at Smyrna.

In addition to the above passage referred to by my anonymous friend, I quote another remarkable passage from Thornton, wherein he states that locusts are dispersed by report of cannon and smoke of powder. "The locusts," he relates, "the curse to which countries are most exposed, where nature has been most prodigal of her gifts, sometimes infest and spread desolation over this delightful region (Moldavia). They even pass the lofty ridge of the Carpathian mountains and light upon Transylvania, where a provident government has called out its regiments to disperse and destroy them with the report of cannon and the smoke of gunpowder."—Vide Thornton's Turkey, vol. ii. p. 326.

INDEX OF SPECIES, WITH AUTHORITIES.

COLEOPTERA.

Genus.	Species.	Country.	Authorities.
Scarabæus	*Sacer*, Linn.	Egypt	Dr. Clarke Lane.
Lepidiota, Kirby	*Hypoleuca*, Wied.	Java	Wiedemann, and Westermann.
Anoplognathus, M. L.	*Viridiæneus*	New Holland	MacLeay, Cunningham.
Orycres	1. *Owariensis*	Cape Coast	Mr. Palin, Mr. Hope.
	2. *Boas*, Fab.	Sierra Leone	Lieut. Sayer.
	3. *Monoceros*, Oliv.	P. B. S.	Hope, and Palin.
Lucanus, Lin.	*Cervus*	Europe	Scopoli.
Tenebrio, Lin.	(Sp. unknown)	Egypt	Dr. Clarke, Niebhur.
Prionus	*Coriarius*	Europe	Amoreux.
Stenodontes	1. *Damicornis* or Macauco Grub	Surinam	Lady Merian. Sir John Forey.
	2. Montac Grub	Mauritius	St. Pierre.
Macrodontia	*Cervicornis*	America	Linnæus.
Omacantha	*Tribulus*	Africa	Smeathmann.
Lamia	1. 8-*maculata*	East Indies	Hope, Heyne.
	2. *Rubus*, Fab.		Hope, De Saram.
Calandra	1. *Chinensis*?	India	Ælian.
	2. Carian Insect	Mysore, East In.	Heyne.
	3. *Palmarum* or Grugru Grub	Mysore, East In.	Linnæus. Lady Merian.

ORTHOPTERA.

Locusta	1. *Migratoria*	Crimea	Linnæus, Dr. Clarke.
	2. *Tatarica*	Crimea	Dr. Clarke and others.
	3. *Muken*	Egypt and Arabia	Niebhur, Herodotus.
	4. *Light Locust*	Arabia	Niebhur, Hasselquist.
	5. *Dubbe Locust*	Arabia	Niebhur, Salt.
	6. *Gregaria*, Forskal	Arabia	Aristotle, Blaquiere, Belzoni, Grey, Jackson.
	7. *Cernensis*, Hope	Madagascar	Ives's Travels, p. 15.
	8. *Devastator*, Licht.	S. Afr., Bosjesmans	Lichtenstein.
	9. *Pupa*, Lin.	Africa	Adamson, Rosenmüller, Ludolphus.
	10. *Cristata*, Lin.	Arabia	Linnæus, Shaw, Ives.
	11. *Mahrattarum*, Hope	Mahrattas, Bashees, Tonquinese	Major Moor, Forbes, Dampier.
	12. *Viridissima*	Europe	Major Moor, Forbes, Dampier.
	13. *Persarum*	Persia, Acridophagi	Morier.
	14. *Locusta Onos*, Pallas	Monguls, Indians	Pallas, Zool.
	15. *Acrydium*	Parthians	Diodorus Siculus, Pliny, Lobos, Abyssinia, page 86.
Acheta	*Smeathmanni*	Africa	Smeathman, Drury.

HEMIPTERA.

Tettigonia	1. *Antiquorum*	Greece	Plutarch, Aristotle, Athenæus, Aristophanes, Ælian.
	2. *Parthorum*	Parthia	Pliny.
	3. *Septendecim*	American Indians	Collinson.
	4. *Galang Pupa*	Australia	Bennett, Sir J. Mitchell, Lhojtsky.

LEPIDOPTERA.

Genus.	Species.	Country.	Authorities.
Papiliones.			
Papilio	1. Larvæ of	Hottentots	Sparrman.
Sphinx	2. Larvæ of	Chinese	Sir G. Staunton.
Cossus	3. *Ligniperda*	Romans	Ray and Linnæus, Sachsius, Schrœder, Favand.
Bombyx	4. *Mori*	China	Kirby and Spence.
Nycterobius	5. Sp. unknown	New Holland	MacLeay.
Euplæa	6. *Hamata* Bugong Moth	Australia	W. Sharpe MacLeay.
Caterpillars	7. Sp. unknown Larvæ of	Yariba	Lander.

NEUROPTERA.

Termes	1. *Fatale*	Caffraria	Lichtenstein.
	2. Sp. unknown	East Indies	Smeathman, Buchanan, Forbes' Oriental Memoirs.
	3. *Smeathmanni*	Africa	Smeathman.
	4. *Arborum*	South America	Koster.

HYMENOPTERA.

Apis	1. Unknown	Cumana.	
Bombus?	2. Unknown	Ceylon	Knox.
Apis?	3. Unknown	Ceylon	Knox.
Apis	4. *Mellifica*	Western Barbary	Dr. Halley.
Formica	1. Sp. unknown	South America	Pinto.
	2. *Cupia*	South America	Piso.
	3. *Tamajoura*	Brazil	Piso.
	4. Sp. unknown	South America	Humboldt.
	5. Sp. unnamed	Sweden	Consett.
	6. Sp. unnamed	St. Paul, Brazil	Caldcleugh.
	7. Sp. unknown	Ceylon	Callaway.
	8. Black Ants	Yariba	Lander, Lieut. Sayers.
		Boschmans	Sir James Alexander.

DIPTERA.

Musca	1. Unknown	South America	Pinto.
	2. Larvæ	Europe	Scopoli.
Tyrophagus	*Casei*	England	Kirby.

ARACHNIDA.

Aranea?	1. Sp. unknown	African Boshjes	Sparrman.
	2. *Edulis*	New Caledonia	Labilliardière, Rœsel.
	3. *Edulis*	European	Reaumur, Shaw, Leland, Spence.

APTERA.

Siro	Cheese Mite	Kirby and others.

Nations described as Eating Locusts, &c., with the Ancient Authorities attached to them.

1. Parthians .....Vid. Pliny, 11, 29; Pliny, lib. 2, ch. 29, lib. 9, c. 29, 35; Plutarch (in Symp.)
2. Æthiopeans ....Vid. Pliny, 6, 30; Strabo, Leo Africanus, lib. 16, ch. 8.
3. Acridophagi ....Vid. Herodotus, Strabo, Agatharcides, 5, 272; Diodorus, Bibliot. 3, 11.
4. Syrians .....Teste Scaliger, contra Cardanum, 639.
5. Lybians.....Leone teste in descriptione Africæ, Artemidorus.
6. Greeks .....Aristophanes, Acham, act 4, scene 7; (Plutarch, in Symp.) Athenæus, lib. 4; Pliny, 11, 26; Ælian, Hist. 13—26.
7. Hebrews.....Moses, Levit. ch. 11, v. 21, 22, and the Talmudic Tract Cholin, ch. 3, fol. 65; Heros Nedarum, fol. 40, 42.
8. Persians.....Tavernier.
9. Chaldeans .....Tavernier, Itiner. Pl. fig. 67.
10. Nasiræans .....Saubeitus, Actis Erudit. 1694, p. 57.
11. Sinensis .....Gonsalvus Oviedus apud Vossum, l. c. cap. 78; Dapper, Descript. Africæ, page 396.
12. Arabians .....Leo Africanus, lib. 9; Agatharcides, lib. 5, c. 27.
13. Nasamones ....Eustathius in Dionysium.

Modern Authorities.

1. Fez .....Clenard in Epistolis, 1541.
2. Jews .....Origen; Chrysostom; Jacobus de Vitriaco; Hermolaus barbarus in Dioscoride, Beda, Kirstenius, in his Notes of St. Matthew, lib. 9; Euthymus in Matthæum, lib. 9.
3. Arabs.....Kirstenius, Hieronymus, Scaliger, Russell, Ædmon, Hasselquist, Forskal, Damir.
4. Lybians .....Dioscorides, 256; Porphyrius, Hieronymus in Jovin, lib. 2, chap. 6.
5. Barbary .....Solinus.
6. Æthiopians and Abyssinians.. Alvarez, Itiner. Æthiop. lib. 1, p. 73; Ludolphus, Æthiopia, ch. 13, p. 67; Lobos' Voyage, p. 86.
7. Egyptians .....Russell's Aleppo, p. 26; Forskal.
8. Mussulmans ....Abdallah.
9. Turks.....Ludolphus, p. 6.
10. Chinese .....Niebhur's Descript. Reg. Sinar. p. 377. If other authorities are required I refer the reader to the Physica Sacra, of Scheuchzer, vol. 2, p. 111, for various other names unmentioned.
11. Madagascar ....Ysbrand in Relat. de Indiâ Orientali.

XX. *Notes on the Habits of various Species of British Ants.* *By* Mr. Frederick Smith.

[Read September, 1839.]

Being desirous of becoming acquainted with the natural history of different species of British ants, I began by examining the nest of *Formica rufa* on the 4th of February. The structure which I have before seen raised as high as two feet from the ground was then nearly level with it. I dug to the depth of about a foot and there found hundreds of neuters in a torpid state; I carried home a bag full of ants, materials, &c., and by carefully examining them found eight females: after being a short time in a warm room they began to show signs of life, and by placing some in a box near the fire they soon recovered their wonted activity; one of the females had part of a wing remaining. I visited the nest on the 14th February, a remarkably warm and beautiful day, and found a few stragglers running about the nest enjoying the sunshine, but not apparently disposed to rebuild or collect materials for the nest. I also saw several individuals of the species *F. fuliginosa*, or jet ant. A succession of cold rainy weather followed, but on visiting them the first week in April I found they had commenced their labours, and by the 28th had again raised their peopled dome; on removing the upper portion of it I found several masses of eggs about two inches from the surface; these masses were about an inch and a half in length, and must, I should think, have been deposited in that situation by the females, as the eggs were attached together as if by some gummy substance; a card with some on will be found in the box of specimens, but they have dried up so as to leave no appearance of any thing resembling eggs. I amused myself by watching the movements of these creatures, some carrying pieces of grass, leaves, sticks, &c., others portions of dead beetles, flies, &c., or dragging, not only truants of their own species, but making captives of individuals of even other species and genera—for I observed in more than one instance *Myrmica rubra* made prisoner; about twenty had seized upon a large spider and were pulling him along with amazing perseverance, while another swarm were refreshing themselves by devouring the remains of an unfledged bird. Observing these things with some attention, I saw a small *Staphylinus* issue from the nest and run down the bank, at the top of which the nest is situated; I captured it, and it proved to be *Atemeles acuminatus*. I searched in

vain for more, and I have never met with it in the nest of *Formica rufa* since, but I attribute this to the nature of the materials rendering it difficult to detect it. I left this nest and examined that of *F. fusca*, in it I found three specimens of *Atemeles*, and while observing the various occupations of the ants I noticed one about to enter with an insect in its mouth; I captured it, and it proved to be the same *Staphylinus*. In about an hour and a half I secured by the same means about ten specimens; one or two I saw endeavouring to make their escape, but they were seized upon by the ants and carried back again. I should observe, that the ants carry to their nest individuals of the genus *Pella*,—having taken from them several specimens of *Pella humeralis;* I have also found them alive in the nest. These observations naturally lead to the question, for what purpose are they carried there? (and having frequently found them there alive, and seen them detained when endeavouring to escape,) I feel convinced that it is not for food. I should, from what I have observed, feel inclined to believe, that during the larva state of the ants, they perform some function, or assist in so doing, for although I have searched most diligently I have not in a single instance found one since that time. I allude to the larva state of the males and females—can they perform any office which causes the development of those sexes? this is mere conjecture, arising from my not having found them since the period of their development.

To resume my observations on *Formica rufa*.—May 10th, I examined the nest and found plenty of pupæ, ♂ and ♀, having no appearance of legs or wings at that time, in any which I examined. May 18th, rudiments of both legs and wings were observable; from this time up to the end of the month they gradually became more perfect in their development, for by the 30th both males and females were easily distinguished when extracted from their pupa cases, as will be seen in my box of specimens. On the 5th of June I found both ♂ and ♀ in the winged state, in the nest; I collected a quantity of cocoons, and several both of males and females came out of their cases in my boxes: about two o'clock I saw several take wing from the nest, wheeling round in their flight and rising high in the air—several pairs fell in a state of copulation into a pond near the nest. Up to the fifth of June I searched in vain for pupæ of neuters; but on the 18th of June I found them in abundance, at which time nearly all the males and females were developed, and, had there not been cold turbulent weather since the 5th, I have no doubt they would all have taken flight. On the 18th I also found eggs in abundance, of course of

neuters, as since that time there has been no pupa of the other sexes. From all which I have observed the following appears to be the history, at least in part, of *Formica rufa;* and the other species agree in all particulars excepting time of appearance, some being later.

About the middle of February, should the weather prove mild, they begin to rouse from the torpid state in which they pass the winter; the neuters, and a few females having remained in the nest during that period, the latter being impregnated the previous summer, as I found them on dissection in the first week in April, full of eggs, about which time the labour of constructing the nest commences, and by the end of the month it is finished, and eggs of males and females laid; but whether those eggs differ from the eggs of neuters I cannot say. At the beginning of May larvæ are found, which change to the pupa state by the 10th; by the 18th legs and wings begin to be observable, and by the end of the month the sexes are easily distinguished. About the 4th of June the perfect insects appear, at which time no pupæ of neuters are to be found; but by the 18th they are found in numbers, by which time all the males and females are developed, after which the neuters continue to appear up to the end of the season, as I found plenty of pupæ on the 5th of August. So that it appears the eggs of males and females are first laid, or if laid at the same time as the neuters are more quickly developed; the females when impregnated do not deposit their eggs until the following spring, or if they deposit the first year, all the progeny are neuters, as no males or females will be found in the nest after June or the beginning of July, and then only an odd one or two will be met with; the impregnated females pass the winter in the nest in a torpid state, and are the young of the previous year, as I found one with part of the wing remaining; and all the males perish after the season of copulation. It has been stated, that the neuters liberate the perfect insects from the pupa cases; they may indeed in some instances assist, but that the insects can liberate themselves I have had several proofs. These observations, I am aware, are but imperfect, but further observation I hope will enable me to fill up some of the blanks remaining in the history of these laborious and interesting communities.

In the box of specimens two or three species have no names attached, not having had time to determine them satisfactorily; but the sexes are placed together correctly, as each species was taken from its own nest. There is one from Hampshire which I suspect to be *F. sanguinea.* I could only find a single female, being

late in the season, August 5th—late, I should say, for that species, as it is just the time for others.

F. rufa and *fuliginosa* appear the earliest in the perfect state; about a month after which follows *F. flava*, *F. pubescens*, &c. I should state that the species, which I imagine to be *F. sanguinea*, had formed its nest by excavating a bank of turf and clay plastered together, forming an inclosure to a plantation.

XXI. — *Some Remarks on Wireworms which seriously damaged the Potatoe Crops of Shropshire, Worcestershire, and Herefordshire, in* 1838. *By the* Rev. F. W. Hope, F.R.S. &c.

[Read 1 April, 1839.]

Wireworms have too often disappointed the hopes of many a meritorious and aspiring horticulturist. They have in repeated instances injured the hops in the counties of Kent, Worcestershire, and Herefordshire, and I now have to record the result of my observations on the potatoe crops of last year, which have been reduced, in many localities, to less than one-third of the annual produce. The disease of the potatoe, which in some parts of England is called the *Curl*, I attribute to the wireworm. On observing several potatoe plants just above the ground in a drooping sickly state, (without an *Aphis* on them,) I was induced to dig them up. In many instances I found the wireworm at work, and adhering to the slices which had been planted; others apparently had been partially eaten, were abandoned, and in a forward state of corruption. Where the plants did *not come up*, which was the frequent occurrence in 1838, I am inclined to think the *slices* were entirely eaten, as not a vestige of them could be found. This same disease, which I propose to call the *Rootworm disease*, in preference to the Curl, attacks the potatoe chiefly at two periods; the first is, when the slices are first committed to the earth: the second attack is frequently apparent when the haulm is considerably grown. To remedy this serious evil in the first of them, I recommend the adoption of my late friend Mr. Andrew Knight's plan of planting *whole potatoes*, and not slices. It is true the wireworm will attack the whole potatoes, but they comparatively

do them little damage. With regard to the crops of potatoes I find, on inquiry, that those which are sown *early* are generally abundant, those which are sown *late* are generally deficient in quantity. There are, however, many exceptions to both rules. Much depends on the nature of the soil, much on the mildness and severity of the season. *Ground* lately *broken up* or obtained from woodland generally abounds at the second crop with wireworms. The same land also, if planted with potatoes two successive years, is sure to yield them in abundance. A common saying in the county of Salop respecting potatoe crops is, *change the seed* or *change the soil;* to the latter opinion I am inclined to agree, and certainly do not place much reliance on the *former.*

The Curl, or rather Rootworm disease, which takes place when the haulm is well grown, may be occasioned by the wireworm feeding on the wiry fibrous roots of the potatoe, which I have occasionally observed to be eaten, affecting the plant by robbing it of its natural juices. In the counties of Salop, Worcester, and Hereford, the failure of the crops of 1838 was very considerable, the real cause of it being little suspected or understood: I feel no hesitation in ascribing it almost entirely to the wonderful increase of wireworms. In some instances I have, during the years 1836 and 1838, taken twenty and even thirty wireworms feeding upon a single turnip-root. Handpicking appears the simplest and most effectual remedy for eradicating them. Let us look for a moment to the *natural enemies* of wireworms, and see if some good may not be derived by encouraging them. Among the natural enemies of the wireworm, I mention the poor *persecuted* mole, that raises his unsightly hillocks on our lawns and grass-plots. It is while in quest of them that he forms his tunnels, his viaducts, and mounds.

I may here perhaps be allowed to state, en passant, that there is probably no animal which man esteems injurious but it repays us in some way or other for the damage it occasions. We are at liberty to check the redundance of species, but are not allowed to attempt extermination. Let us proceed with other enemies of the wireworm. The harmless toad, too often wantonly trodden underfoot, plays his part in diminishing their numbers. Among birds, poultry, pheasants, and hosts of the smaller tribes, contribute to thin them; the invaluable rooks are unceasingly in quest of them; they boldly follow the plough-tracks for their oft-repeated daily meals, and will glut themselves to satiety in the infected turnip-field. The English farmer would act wisely did he always encourage and protect the rooks. If on the one hand

they occasionally rob him of some ripening grain, or stock his wheat up, let him consider, on the other hand, the *good* they do him by destroying the tens of thousands of the wireworm, and the countless myriads of noxious insects which every where abound. Of the various schemes adopted for destroying the wireworm, the most successful is Sir J. Banks's plan of burying slices of potatoe at the roots of the infected plants in order to entice the worms. If potatoes happen to be scarce, other baits may be successfully used, such as mangel-wurzel, beet, carrots, as well as cabbage-stalks and lettuces, &c., and even the parings of turnips and potatoes. The baits should be regularly examined and the wireworms handpicked from them. When these pests abound in the wheat field, Lord Albermarle's method may be tried, in which he recommends rape-cake as a manure to the ground drilled for wheat. It was sown with rape-cake in powder across the field. This plan, although reported to be successful in saving the forthcoming crop of the year, is not in my mind satisfactory, as it does not follow necessarily, because the crops sown with the above manure are unattacked, that therefore the wireworms are destroyed. The evil, in my opinion, is only deferred for a period; it is certainly not eradicated. From the above short observations, I trust that sufficient matter has been adduced to prove that agriculture may derive valuable assistance from the science of Entomology, and I feel fully convinced that we can scarcely do a greater act of kindness, or be of more service to the farmer, than by pointing out the nature and habits of those insects which destroy his crops. If one of the avowed objects of this Society is the attempt to preserve the crops of *the country,* we may probably gain the support of the agriculturist. Institutions like ours do not necessarily command success; by our measures however we may richly deserve it.

XXII. *Note on the Metamorphosis of Caterpillars.* *By* R. J. Ashton, Esq., F.L.S. &c.

[Read 5th November, 1838.]

On that interesting part of the physiology of insects, the *metamorphosis*, an extraordinary discrepancy has hitherto existed between the statements of some of the most eminent investigators of this department of creation. I say *extraordinary*, because, for a matter capable of such easy and satisfactory elucidation as is the subject of this dispute, to have been the theme of such contradictory assertions from a considerable time back down to the present hour, as this has been, cannot but appear extraordinary. The point in difference is this:—Swammerdam, the most assiduous and expert Entomologist and one of the acutest observers that perhaps ever lived, made the discovery of a fact, which certainly deserves to be ranked among the most marvellous operations which are exhibited in nature:—viz. that at the same time that the moult of the external integument of the caterpillar takes place, the mucous tunic of the intestinal canal is also stripped off and rejected through the anus, and not only that, but each of the attenuated and delicate ramifications of the air vessels, invisible, or nearly so, as they are to the naked eye, sheds its internal lining, which, to the number of some hundreds, are withdrawn through the spiracles, thus leaving the animal completely renovated as it were both within and without, with increased capacity or wholly altered form. This observation was corroborated by Bonnet, a naturalist no less celebrated in this branch of science than the former. On the authority of such eminent men the fact, prodigious as it must appear, was generally received, until Herold, a very able physiologist, asserted, that *the inner skin of the intestinal canal is never cast*, and as respects the *trachea*, such moult is confined to the *large main trunks, none taking place in their smaller ramifications*. Thus a complete and irreconcileable discrepancy existed between these acute physiologists, the only difference in the nature of the observations, upon which their statements were professedly grounded, being, that Swammerdam appears to have made his on the larvæ of beetles (*Oryctes Nasicornis*, et al.), whilst Herold's appear to have been made on the caterpillars of the *Lepidoptera*. Later writers on this subject* appear to have been contented to discuss the question on the

* Kirby and Spence, Burmeister, &c.

relative merits and credibility of the before mentioned investigators, and thus the question remains at the present moment unsettled, though capable of the easiest and most conclusive ascertainment imaginable. Such being the case, I take the liberty of stating the observations which I have lately made on this subject, and which in fact drew my attention to the dispute I have just detailed. Happening to detect a caterpillar of *Sphinx Ligustri* in the act of changing its skin, I made it go through the operation in my hand, so as to watch its progress more minutely. As soon as the external integument was, after much writhing and contortion, completely slipped off, as I found it still adhered loosely to the insect, I touched it with my penknife to cause it to separate from it, when I found that it was yet connected with it in some essential manner, and, on a closer examination of the cause, I perceived at once that it was occasioned by the mucous coat of the intestinal canal, which was in the act of being gradually passed out at the anus, and being in intimate connexion with the recently shed external integument, or, according to Burmeister, *merely a prolongation thereof*, occasioned that attachment of the old skin to the caterpillar which at first had perplexed me. To this observation I may add, that I have since discovered the moulted colon in the skin of a caterpillar of the same species cast off on assuming the pupa state, lying folded up at the posterior end thereof, exactly as described by Swammerdam. As this my testimony, slightly as it might be thought of by itself, directly establishes the accuracy of such illustrious observers as Swammerdam and Bonnet, I trust it will be received as a satisfactory affirmation of the fact of *the moult of the lining of the intestine*, so unwarrantably denied by Herold. Then as to the moult of the *smaller ramifications of the trachea*, I am able to give quite as conclusive evidence of the correctness of Swammerdam's account in every particular, and consequently of Herold's inaccuracy. Quite apart from any consideration of the conflicting statements of the above naturalists, I happened to be examining the skin cast by a caterpillar of *Sphinx Ligustri* on changing into the pupa, when my attention was attracted to the very conspicuous thick whitish bands, which appear, one on each side of the body, nearly its whole length. On a close examination, I perceived that these bands were divided into a certain number of equal lengths, one end of each of which was intimately connected with a spiracle, whilst the other end was free and unattached, but from the circumstance of their all lying down in the same direction (viz. from the posterior end towards the anterior), and being of sufficient

length to reach from one spiracle to another, it occasioned the appearance of what I at first took for a *continuous* band as above mentioned. On reflection it at once appeared to me that these must be the *exuvia of the trachiæ*, which, as described by Swammerdam, "being collected into eighteen thicker and as it were compounded ropes, nine on each side of the body, when the skin is cast, slip gently and by degrees through the eighteen apertures in orifices of the pulmonary tubes before described, having their tops directed upwards towards the head."* To ascertain this beyond a doubt, I gently moved one of the portions of the band above mentioned about in water, when I had the satisfaction of seeing it immediately separate into those minute filaments, which proved the exact correspondence of my observation with Swammerdam's statement. It was so late in the season when my attention was drawn to this subject, that I had no opportunity of examining the moults previous to the change into the pupa, but I entertain no doubt that precisely the same operation is undergone in the former moults, and that because Swammerdam states such to be the case, whose testimony on this head has never been impugned but by Herold, whose statement I trust I have abundantly shown to be quite unfounded.

I must not omit to mention that the correctness of Swammerdam is likewise confirmed by Burmeister, inasmuch as he relates† that he had himself witnessed the facts described in the moulting of the *Libellulæ*, from all which circumstances it is apparent, that this *internal* moult, as described by Swammerdam, is universal throughout the class of insects, being thus shown to exist in the *Coleoptera* by Swammerdam, in the *Neuroptera* by Burmeister, and in the *Lepidoptera* partly by Bonnet and more fully in the present paper. How so eminent a man as Herold could fall into such an unfounded delusion as regards this matter, and in defiance too of the express declarations of such an accurate observer as Swammerdam, is a mystery. For myself, I have had no object in bringing forward the subject except to confirm the truth, careless as to whose reputation might be confirmed or affected thereby.

* Biblia Naturæ (Hill's Eng. Translation), vol. i. p. 135.

† Shuckard's Translation, p. 428.

XXIII.—*Description of a Species of* Mygale, *from Ionia, with its Nest.* *By* Sydney Smith Saunders, Esq.

[Read 2 September, 1839.]

Mygale Ionica.

Thorax subcordiformis, posticè depressus.

Oculi rotundi, anteriores quatuor lineâ ferè rectâ, intermedii vix retrorsum, jacentes; posteriores inter se remoti, duplici serie semel dispositi; anteriores duo externi majores, reliqui sex magnitudine subæquales.

Mandibulæ articulo primo magno subhemisphærico, dentibus plurimis subtùs, spinisque anticè sex (quorum tres magni) armato; unguibus simplicibus.

Pedes hirsuti, posticis longioribus, reliquis longitudine ferè æquis.

Tarsi obtusi bicuspidati, anteriores quatuor spinis mobilibus armati, reliqui vix spinosi: ungulis basi dentatis.

Palpi articulis extremis utrinque spinosis.

Habitat Insulis Corcyræ et Zacinthi.

Long. corp. 7—9 lin.

Differt a *Mygalis Fodiens*, *Cæmentaria*, *Carminans*, *Cellicola*, *et Ariana* (?) dictis, oculorum dispositione.

Confert hâctenus cum *M. Sicula*; sed differt eâdem pedum armaturâ, et mandibularum unguibus simplicibus.

In the Annales de la Société Entomologique de France (vol. ii. part 1), M. Audouin has recorded a series of observations upon the nests of certain mining spiders, and in particular upon those of *Mygale fodiens*, Walck.

During a short excursion to Zante, having noticed a number of nests differing somewhat in their construction, and belonging as it would seem to a new species (if not to the *M. Ariana*, Walck., to which I was at first inclined to refer it), I was induced to take up several for the purpose of examination, which has enabled me to lay before the Society the following details.

These nests were found close round the roots of the olive trees in a somewhat elevated situation, and were generally observed two or three together about the same tree. The soil was a sort of sandy clay, of a light ochraceous colour, very different from the "terre argileuse d'une rouge de brique," described by M. Audouin. The upper portion of the nests was also partially raised

above the surface of the ground; but this may have arisen from the washing away of the surrounding earth during the heavy autumnal rains, the more especially as from the coating of moss which showed itself in many cases upon the upper surface of the operculum, they could not have been of very recent construction.

The form and structure of this operculum were also peculiar, for, unlike those of the *Mygale fodiens*, which are represented as closely assimilated to the surface of the soil, and for the opening of which the only facility (according to M. Audouin's observations) consists in the numerous inequalities of the exterior covering of the lid, by means of which the insect is enabled to secure a sufficient hold; the opercula of those which I met with at Zante were all more or less provided with an elevation of the posterior margin directly above the hinge (as shown at fig. 9) to the extent in some instances of one third of the diameter of the lid. The object of this projection could not be mistaken, for, acting as a lever, the slightest pressure upon it would suffice to raise the operculum, and afford the readiest ingress. This elevation appears to be produced by a gradual lengthening in the direction of the hinge of the respective layers of which the lid is composed.

The readiness with which the opening of the lid is effected by this ingenious contrivance of the lever, might lead one to suppose that an extra degree of care would be displayed in regard to the means of firmly closing the same from within, in the event of outward attack. The *M. cæmentaria* and the *M. fodiens* are reported to cling to the door of their habitations for this purpose; and in the nests of the last-mentioned species, a number of minute holes have been observed around the inner side of the operculum, which M. Audouin ascribes to the purpose of enabling the occupant to secure a firm hold with its claws on such occasions. No such provision, however, is made in the case of the Zante *Mygale*. I have also in my possession the nest of another mining spider (of the species of which I am ignorant, from not having secured the occupant), where the series of holes alluded to is disposed all round, and not merely in front of the operculum on its interior surface, as minutely described by M. Audouin. This nest was from Corfu, and the construction appears in many respects to resemble that of *M. fodiens*. The length of the tube is about four inches, and its lower end is slightly oblique. The *Mygale Ionica*, however, is also met with not unfrequently at Corfu, as I am informed by my friend the Rev. Charles Kuper, a diligent Entomologist, who has been for some years resident in that island.

The hinge of the nests prepared by this species is apparently different from that of the nests which came under the observation of M. Audouin, although the same object of providing for the self-closing of the valve is effected by the web, which connects the tube with its coverlid, being in some degree extended on each side of the hinge, thus giving at the same time greater apparent width to the hinge itself, but leaving the web sufficiently loose on each side, so that, in conjunction with its elasticity, it should just admit of freely opening the valve as far as the vertical line, or thereabouts, without risk of injury.

The nests of an undescribed species of mining spider from New Granada, figured by M. Audouin in the "Annales des Sciences Naturelles," for April, 1837, appear to be furnished with a hinge somewhat upon this principle: the underside of the valve is also divested of the series of holes before alluded to; but it differs from the Ionian one in other respects. The insect in question did not accompany the nest, and was not known to M. Audouin.

The interior lining of the tube of *M. Ionica* appears, from all the nests which I have seen, to be of a less perfect consistency than that of *M. fodiens*, and divested of that circumference of macerated earth, or exterior walls of a more solid consistency than the surrounding mass, which in those of the last-mentioned species give strength to the work and facilitate the separation of the tubes from the mass in which they are imbedded. In attempting such separation, the tubes of the Zante *Mygale* invariably broke asunder, although this effect may be in some measure attributed to the excessive dryness of the earth at the time of excavation, and perhaps in part also to the circumstance of the glutinous matter, with which this description of tissue is usually provided, being dissolved and wasted, at a former period, from the action of the same causes to which I have ascribed the appearance of the nests above the surface of the soil.

The length of these tubes might be about four and five inches. Those of *Mygale cæmentaria* (as described by M. Léon Dufour, in the Annales des Sciences Physiques) are stated to be about two feet deep: those, however, of *M. carminans* (the supposed male of *cæmentaria*), are, according to the observations of the Abbé Sauvages, not more than seven inches long: while those of *M. fodiens*, in the Paris Museum, although cut off within about three inches of the surface, are supposed by M. Audouin to have been possibly of considerable length, for, in alluding to a slight obliquity observed towards their lower extremity, he says, "peut-être même se recourbaient-ils davantage en se prolongeant beau-

coup plus avant dans la terre." I am however inclined to infer, from the similarity of one of the Corfu nests already noticed, that the length of the tubes constructed by *M. fodiens* probably does not exceed those of *M. Ionica.*

Having now arrived at the lower part of the nests, it remains for me to notice a very remarkable peculiarity which presented itself in this portion of some of those which came under my observation at Zante, the extreme end within the ground being formed somewhat upon the same model as the top, that is to say, being provided with a second operculum of greatly diminished size, and opening downwards as shown at figs. 12, 13, and 14.

The only conjecture which I would hazard as to the use of the moveable process referred to, which I should mention only occurred in some nests, is, that it may possibly have answered the purpose of a drain to the bottom of the nest; for in no other way can I account for the construction of these singular portals in a situation where, to all appearance, they were destined to remain closed throughout the whole period of their existence. In any case, however problematical the advantages to be derived from this operation may at first sight appear, I feel no hesitation in affirming, that the result of further observation will convince us that the ordinary sagacity of these ingenious miners has not been at fault, or deserted them in this particular instance. (See Art. XXIV.)

It should be added, in order to avoid all possibility of misconstruction upon the subject, that although the nests figured are presented as nearly as possible of natural size, I cannot affirm, nor do I believe, that the parts represented, or either of them, are portions of one and the same nest; but simply that, from a number of nests extracted, the top of one, and the bottoms of two, are here produced, the originals of which I have also brought for inspection at the present meeting.

In closing this communication I may observe, that it is recorded of a species of mining spider mentioned in Brown's History of Jamaica (page 420, *Tarantula*, No. 2), that its nests are constructed with a double doorway; the second valve, however, appearing in this case to have been at the top, and placed in conjunction with the ordinary one, so as to have had but one hinge in common. Brown also gives a figure of the nest (Tab. 44, fig. 3, and 3–6) with, to use his own words, "both its *valves*, which are so well contrived, and so strongly cemented, that whenever they are forced open, the native elasticity of the ligaments that fix them, restore them immediately to their usual position." Another nest, mentioned by Olivier (Encyclop. Méth. vol. i. (?) page 230),

as being found in Guadaloupe, is stated to have two valves of unequal size, playing in like manner upon a single hinge, the larger one taking its rise from the hinder part of the smaller, and being so adapted that it would seem to cover this latter as well as the margin of the orifice itself. Baron Walckenaer, alluding to these nests, in his remarks under the head of *M. nidulans*, in the "Suites à Buffon," infers, that the insect by which they were constructed was probably different from the ordinary species observed at Jamaica, of whose economy some further details have recently been laid before this Society by Mr. Sells. At all events the description of Olivier so strongly coincides with the appearances presented by Brown's figure, that there can be little hesitation, I think, in referring them to the same species. The length of the nests also appears to correspond, Brown's figure measuring $4\frac{3}{4}$ inches, and not $3\frac{1}{2}$, as through some inadvertence stated by Baron Walckenaer.

On my return to the Mediterranean, I hope to have further opportunities of observing the habits of the *Mygale Ionica*, and perhaps of detecting the insect in the act of building, which may enable me hereafter to lay before the Society some additional particulars connected with the construction of these ingenious retreats.

The accompanying figures upon Plate IX., for which I am indebted to the kindness of Mr. W. W. Saunders, exhibit—

1. The insect, of natural size.
2. The eyes.
3. External view of right mandible, magnified.
4. Internal view of ditto.
5. Hooked process of ditto, apart.
   with *a*, the small hole from which the poison is supposed to issue.
6. Portion of fore leg, magnified.
7. Portion of hind leg, magnified.
8. Bicuspidate process of tarsus, with claws.
9. Upper portion of nest, with lid partly open (side view).
10. Ditto ditto (front view).
11. Longitudinal section of ditto, and of operculum.
12. Lower portion of nest, with smaller valve open.
13. The same (side view).
14. Lower portion of another nest reversed, the valve closed.

XXIV. *Additional Observations on the Habits of* Mygale. *By* S. S. Saunders, Esq.

[Read 4th July, 1842.]

Having obtained several nests which were taken from the ground in the month of October, and incased in some of their natural earth within a small box the top of which was closed with bars of wood, I placed this box out in a balcony, where it remained neglected and unopened until the month of April following, when the spiders were all found alive and well, clinging to their opercula in order to prevent the same from being opened. This was effected by the bulb of the coverlid being firmly grasped with the four anterior feet and palpi, the remainder resting low down upon the posterior walls of the tube, while the porrected mandibles were firmly inserted in the front part of the tube near the top, thus offering a powerful resistance, greater than would have been effected by the mandibles acting upon the valve as mentioned by M. Audouin in his observations on *M. fodiens*.

The upper portion of two of these nests, which broke in the process of extraction, were then placed in an open flower-pot, with a sufficient quantity of the same earth well moistened and compressed, so as to form a compact body in imitation of the soil itself, the spiders clinging all the while to the coverlid without regard to their temporary exposure through the broken part of tube. Thus imbedded, it remained to be seen whether they would construct a new bottom to their nests, and whether such bottom would be closed where the tube now terminated, or be carried further down into the earth according to the usual depth.

A third spider was placed in the same pot, with his tube top in a *reversed* position, the operculum being buried to the depth of about three inches, and the open part of the tube, where broken off, being placed on a level with the surface, in order that the insect might be tempted to adapt a new door to this part in the actual emergency.

Fearing, however, that the spider might escape before the necessary steps could be taken to cover the pot with some transparent substance to observe the work, the hour being also late, a strong paper stopper was fixed in the top of the tube to await until the following day. This remained undisturbed up to eleven o'clock at night; but on my return in the morning I found this stopper lying aside, and the top of the tube closed with a single

layer of web and earth, offering but slight resistance to the touch, although by no means transparent; the side destined for the hinge (as marked by the circumference being here interrupted by a straight line), being on a level with the surrounding earth, whereas at the opposite part, where the lid would open, the new cover was lowered about one quarter of an inch.

The danger of disturbing the occupant in this stage of the work induced me to refrain from any attempt to open the new lid; but in order to ascertain whether the next layer would be added from without or from within, I dropped a certain portion of flour on the outside to whiten the top. The next morning, on examining the nests, I found to my great surprise that the new door had been entirely cut away, and was lying by the side of the tube, which in the place thereof was now found covered with a strong texture of whitish web. The next remained in the same state from the 26th of April to the 2nd of May, when it occurred to me that the spider had been compelled to discontinue its work in consequence of the earth not being any longer sufficiently moist for the purpose; and had therefore had recourse to the temporary expedient of closing its habitation in the way alluded to until another opportunity, when, supposing the nest to be in its natural site in the open ground, the necessary moisture should have afforded the required facilities. I gave the earth therefore a good watering, without however disturbing the web, allowing a slight sprinkling to fall thereon as a sort of warning notice; and the next morning on visiting the nest I found a new door perfectly formed, which, having marked with flour as above, was observed to remain unaltered from the 3rd to the 13th of the month, when, considering the work finished, I extracted the nest, which now presented an operculum at each end, both revolving on their hinges and complete in every respect.

The spider, mindful of the necessity of providing a rim for the support of the new valve, yet unable to regulate the process as it might have done in an ordinary case, had had recourse to the expedient of stretching in some degree beyond its natural dimensions the upper part of the web with which the tube is lined, making the surrounding earth give way in a like proportion.

Some explanation is thus afforded of the singular fact noticed on a previous occasion of some of the nests found at Zante being provided with an operculum at bottom as well as at top, the lower one being formed to open downwards in such a manner that it was obviously of little or no use to the occupant in its then state from its immovable position in the earth. The nests in question

being constantly exposed to the danger of becoming thus reversed in the process of opening the ground around the olive trees (an operation annually performed), the occupants in such cases might not improbably have recourse to a like expedient of closing the inverted tube with a new door.

The circumstance of the lower operculum being smaller than the upper one, would naturally occur in a nest so reversed, since the tubes are usually somewhat more spacious towards the bottom, so that when inverted and broken off, the new valve would of necessity be of greater dimensions than the original one. Still, however, the appearance of the lower operculum in the Zante nests was such as to lead me to entertain some remaining doubts whether this could have been the original entrance to the nest; perhaps the inconvenience experienced in those cases had only proved a partial one, self-adjusted subsequently by the gradual subsiding and settling of the clods.

With regard to the other two nests which I had placed in the same flower-pot with the one reversed as aforesaid, (these having, as already observed, no bottom to their tubes,) I had subsequently placed the pot in the open garden, finding that the domesticated habits of these spiders retained them to their homes, and wishing to afford them an opportunity of obtaining their natural food in accordance with their ordinary habits. After the lapse of some weeks however I became aware that the gardener had been in the habit of regularly watering this in common with other flower-pots; and seeing that the doors were nearly closed with the washings of the earth, I concluded that the inmates had fled; when, taking up the nests, I found the lower end much the same as when first placed in the pot, and the tubes themselves untenanted. Upon further search however I found both spiders embedded in the earth at a greater depth; whether or not they had been intent on prolonging their nests I cannot say, but at all events no tapestry had been produced for the lining of this portion of their mansions.

These tubes being now spoilt, I removed one of the spiders to the abode of one of it congeners, which was vacant and consisted of the bottom only, to see whether it would readily adapt itself to this change of domicile; and a new door was found finished the next morning with the same course of proceeding as in the former case, accompanied with the rejection of a paper stopper, the only difficulty experienced being in inducing the spider to enter the nest, which is equally witnessed on restoring one to its own abode after having extracted it, this being occasioned doubtless by the fear of molestation from within. I may add, that

there appears at all times a dulness of perception about these insects when abroad (however much kept from the light), which ill comports with their wonted sagacity at home. Indeed, during a long course of observation, I have never, under ordinary circumstances, seen one of these spiders quit its nest of its own accord (which is evidently a rare occurrence), or even to have its door open, whether by night or by day.

I have not been able to observe sufficiently the process of constructing a nest ab initio, although I had desired to do so, and for this purpose placed one of the spiders in a glass jar, with a sufficient quantity of its natural earth, after the required precaution of moistening, &c. By the next day no work had apparently been done beyond a partial disarrangement of the surface in one or two parts. The jar was placed in a corner of the room and completely shaded from the light, but no further progress was made during the day or evening. The subsequent morning, however, I found my spider partially imbedded in the earth, in which state it remained quiet throughout the day, and the following morning it had disappeared; when after close inspection, I observed an indistinct circular mark in one part near the side of the vessel, which proved to be the door of a new nest, as I assured myself a few days after by extracting the same, it having however only been carried down an inch or thereabouts into the earth, and being therefore still in progress of construction. Hence it appears, that it is not requisite to finish the tube in the first instance, the primary object being that of defence from without; neither did I observe that any portion of the soil had been thrown out in the process of excavation, the earth being probably got rid of in the formation of the compressed mass, known as the exterior walls of these habitations.

After having thus provided a variety of occupation for these little labourers, and obtained several nests with varying modifications, (and among these one which leads me to suppose that the double valves of the West Indian nests, described by Brown and Olivier, were probably the result of a new operculum being substituted for a damaged one, the old valve still remaining attached; or otherwise originated in the separation of the outermost layer of one of these valves, warped by tropical heat), I found that a new process had been adopted for the purpose of more effectually precluding further disturbances, the opercula being in two or three instances retained close shut by means of a firm texture of web; which having obliged me to tear away the whole top of one tube in the course of opening, I determined to

examine another with greater precision from within. This being effected by cutting off the top of one of these nests at about the depth of an inch, I found the inside perfectly secured; not, as I had supposed, by an assemblage of threads connecting the front of the valve with the lining of the tube, but by a complete tapestry thrown over the whole orifice of the tube in connexion with the operculum, so that the interior more resembled the top of a thimble, the texture being at the same time of the most delicate whiteness, and firm as that usually presented by the bulbous interior portion of the opercula.

I cannot say that the patience of these spiders had not been exhausted by my repeated experiments, although from a similar circumstance having taken place about the same time in several nests, the inmates of some of which had been comparatively less inconvenienced, I am rather disposed to attribute this proceeding to the ordinary inspirations and habits of their race.

I now determined to notice during how long a period this seclusion might last, the more especially as the powers of abstinence of these insects had already attracted my attention, not only from having never observed these spiders in quest of food, but from the very position in which six or eight of these nests had all along remained, deep in a box which had stood for six months on an elevated ballustrade upon the first floor, where, at all events, the supply of food must have been exceedingly limited, without any apparent effect, however, upon the usual corporature of the inmates.

It was not until the end of October that the valves were set free, at which period I again cut off the top of one which remained closed, and found it in the state before described, the spider being in perfect health, and presenting the usual plumpness of aspect. I did not, however, find any progeny in either of the nests.

Other six months have since elapsed, the box occupying the same place as before, and on observing the nests, I find four still tenanted, with the spiders in good condition, the opercula being, however, in a somewhat defective state from frequent handling, although the required preparations will doubtless be readily effected, so soon as the earth may be brought to a convenient state by proper watering, the covered position of the box having protected it from the ordinary atmospheric influences.

It cannot be doubted, that very many circumstances connected with the habits of these extraordinary insects still demand further inquiry, and in apologizing for the imperfect state in which

this notice is presented, it may be considered as the not unfrequent result of investigating the wonderful workings of instinct, that the more we direct our attention to the subject, the more we feel the want of more diligent research, and the insufficiency of our attainable results.

XXV. *Observations on the Species of Spiders which inhabit cylindrical Tubes covered by a moveable Trap-door.* *By* J. O. Westwood, F.L.S. &c.

[Read January, 1840.]

Of all the habitations constructed by annulose animals for their own abodes, those cylindrical retreats lined with silk and fitted to the size of the creature's body, are amongst the most ingenious. These are of two kinds: 1st, those which are moveable, the creature generally weaving various extraneous materials into the texture of the web, and often with the greatest regularity, (amongst which I may particularly mention the nests made by the caddice worms and the caterpillars of various *Lepidoptera*); and 2ndly, those which are fixed, being formed either in wood or the earth. Instances of the latter are afforded by various species of wild bees and wasps, but they are of a comparatively rude construction compared with the cells of the trap-door spiders. The interest excited by the accounts of these spiders has been kept alive since the middle of the last century, when M. Sauvages published his account of an "*Araignée maçonne*," in the Mémoirs de l'Academie des Sciences, for 1758. This species was the *Mygale cæmentaria* of Walckenaer, respecting which M. Dorthes published some additional particulars in the second volume of the Transactions of the Linnæan Society of London. Another South European species, *M. fodiens*, Walck., *A. Sauvagesii*, Rossi, has afforded to M. V. Audouin materials for a very interesting memoir, published in the "Annales de la Société Entomologique de France," vol. ii. pl. 14. These species have been separated from the genus *Mygale* by Latreille, under the name of *Cteniza*, but M. le Baron Walckenaer, in the first volume of his "Histoire Naturelle des Insectes Aptéres," has reduced them again to a family of the genus *Mygale*. Our valued member, S. S. Saunders, Esq., has laid before this Society the details of the economy of another species, from Albania, which constitute one

of the most interesting communications hitherto published in our Transactions: (See the preceding Arts. XXIII. and XXIV.) Mr. Shipster has also exhibited, at a former meeting of this Society, a nest received by him from New Holland, remarkable for having the trap-door of the orifice scarcely more than semicircular.* Another nest from New Granada, with a circular trap-door, has recently been figured by M. Audouin, in the "Annales des Sciences Naturelles." As the architect of this nest was not observed, it is imposible to say whether it was the trap-door spider, the history of which has been detailed to us by our excellent member, W. Sells, Esq., whose personal knowledge of the subject has enabled him to give to his details an interest, which those whose descriptions are founded only upon preserved specimens can never hope to attain. This insect is an inhabitant of Jamaica, and apparently of other parts of the new world, and was first described by Brown, in his "History of Jamaica" (p. 420, No. 2, pl. 44, fig. 3), and has been referred to the genus *Mygale*, without the expression of any doubt by Latreille, as well as by Olivier and others, including Walckenaer, who places it at the head of his section *Les digitigrades mineuses*, or the genus *Cteniza*. The last named authors had evidently, however, never seen the insect in nature, and Latreille had only seen a specimen of it casually in the collection of the Linnæan Society of London.

The account given of it by Brown is very short, being as follows: "*Tarantula 2. Fusca major subhirsuta, sub terram nidulans.* The black *Tarantula*. This sort is represented of the natural size, as well as its nest *and both its valves*, which are so well contrived, and so strongly connected, that whenever they are forced open, the native elasticity of the ligaments that fix them restore 'em immediately to their usual position. It is most frequently in the loose rocky soils, and nestles under ground."† Brown's figures correspond very well with the spiders brought home by Mr. Sells, so that we should consider his insects as the same as that described by the former. This is the more necessary to be decided, because Brown's figure of the two valves at the orifice

* Mr. Bennett has shortly described the nest of a species of trap-door spider frequently observed about the plains in New South Wales; he however gives no description of the insect by which it is made (Wanderings in New South Wales, vol. i. p. 328, quoted in Entomol. Mag. vol. iii. p. 215).

† Brown's figure represents the regular trap-door partly opened, having a larger and looser flap attached to its base at the hinge above, and falling backwards; and a specimen of the nest in the Linnæan Society's collection is furnished with a *short* lax membranous appendage on the outside of the trap-door immediately behind the hinge.

does not at all correspond with Mr. Sells's figure of one of his nests, and leads us to conclude either that some inaccuracy exists in Brown's observations, or that Mr. Sells's insect is not specifically identical with Brown's, or else that the species occasionally forms two valves to its nest, as indeed the observations both of Mr. Sells and Mr. Saunders seem to prove is the case. Latreille also described a nest which he had received from Jamaica, (forwarded by an Englishman, Mr. With, to M. Royer, see "Cours d'Entomologie," p. 508), with a single valve, as identical with Brown's species, noticing at the same time the difference between it and the description and figure of Brown (Latr. Vues générales sur les Araneides à quatre pneumo-branchies, in Nouv. Ann. du Muséum, t. 1). The Baron Walckenaer, however, questions whether the single-valved nest be that of Brown's spider, observing, "il est permis de croire que Latreille a decrit le nid d'une espèce de *Mygale* mineuse différente de celle de Brown, et qui est peut-être le même que celle qui au rapport d'Olivier, a été observée à la Guadaloupe par M. Badier," who considered his nest from that island as identical with that of Latreille, although it was described as having two valves, which were not "opposées mais superposées, et ont une charnière commune; la plus grosse et la plus large est soudée dans la moietié de la partie postérieure de l'autre et doit la recouvrir ainsi que les margelles du trou."—(Hist. Nat. Ins. Apt. 1, 234.)

It thus appears questionable, whether there are not two species of American trap-door spiders, which differ in the mode of forming the valves of their nests.*

Let us now endeavour to trace the nomenclature of the Transatlantic species.

Linnæus proposed the name of *A. venatoria* for a spider far too concisely described, referring, as above mentioned, to Brown's forty-fourth plate, but to the second figure on that plate, whereas the nest with the double trap is figure 3, 3*a*, 3*b*, on the same plate, to which Linnæus has nowhere referred; neither has Linnæus described any spider under the name of *A. nidulans*, as quoted by Latreille in his Memoir on *Mygale* above referred to. We find this last name first and for the only time employed by Fabricius, in the "Mantissa Insectorum" (vol. i. p. 343), as the name of a spider in the collection of Sir J. Banks, from the American islands, and to which description he added a reference

* It may be mentioned in connexion with this observation, that there are several distinct American species now known, belonging to the same genus as Mr. Sells's Jamaica spider.

to Brown's plate 44, fig. 3. In his subsequent work, however, the "Entomologia Systematica," vol. ii. p. 409, he incorrectly gives his *A. nidulans* as synonymous with the *A. venatoria*, Linnæus, retaining his reference to Brown's plate 44, figure 3, although Linnæus had referred to fig. 2 only. It fortunately happens that the identical copy of Gronovius which belonged to Linnæus is now preserved in the Linnæan Society's Library, and as Linnæus had written the name *venatoria* opposite to the description of the spider given by Gronovius under No. 938, it is clear that *this* Linnæan description is intended for the species described by Gronovius, which belongs to a totally different family, which does not make tubular cells, but carries its egg-case beneath its body, as correctly described by Gronovius, Merian, and Sloan, the first three Linnæan authorities for the species; of which also the specific name implies a different economy. The spider, however, figured by Brown in his 2nd figure of plate 42 is a true *Mygale*, and Linnæus had written, opposite to its description, in his copy of Brown's work, "*araneus avicularius*," but he does not cite it in his account of that species, but incorrectly refers it to the Gronovian spider. The Baron Walckenaer is, therefore, correct, when he says that Linnæus incorrectly cited Brown's figure 2 as a synonym of the Gronovian species; but he is in error in stating that Linnæus referred to Brown's figure of the *M. nidulans*, Linnæus having no where noticed the figures given by Brown of the trap-door species.

Kirby and Spence, Koch and others, following the later nomenclature of Fabricius, have described the trap-door Jamaica species under the name of *Mygale* or *Aranea venatoria*. That specific name, however, has been shown to belong to Gronovius's species, which Latrielle gives as a *Thomisus*, and Walckenaer as an *Olios*. The latter author, however, although citing Linnæus correctly, prefers adopting a specific name of his own, *O. Leucosius*, which must be rejected in favour of the Linnæan name.

We know not what authority Fabricius had for giving Sir Joseph Banks's insect as the architect of the nest figured by Brown in his third figure, but we know that Latreille's description of his *M. nidulans* is derived from the very same specimen described by Fabricius, Sir Joseph Banks's collection being now in the possession of the Linnæan Society.

Supposing the existence of two species differing in their modes of forming the valves of their nests, it is evident that if Fabricius be correct in giving the reference to Brown's figure 3, under his *A. nidulans*, Latreille must clearly have erred in considering the

nests with a single trap-door as of that species, as we are led to the conclusion, that *A. nidulans* makes a double valve, similar to that figured by Brown in his 3rd figure, and described by Olivier, from M. Badier's Guadaloupe specimen, whilst the single-valved nest is the work of a distinct species; and, as Mr. Kirby, in his "Bridgewater Treatise," has figured the single-valved nest of the Jamaica insect, whilst another figure of the nest and spider, from specimens in the British Museum, has been published in Griffith's "Animal Kingdom," *Arachnida*, pl. 7, under the name of *Mygale nitida*, without any reference to the two species noticed above, we may adopt this name for the single-valved species, until it shall be determined (as I have no doubt will be the case) that the difference in the formation of the valves is the effect of accidental circumstances.

There are also figures of the single-valved nest and its architect in the "Naturalist's Miscellany" of Shaw and Nodder, pl. 614.

At the period when Latreille made his examination of the Banksian collection, the genus *Mygale* had not undergone any dismemberment; consequently the large Jamaica species was retained by him under Fabricius's name of *nidulans* in that genus, and as he observed that the insect "se rapproche de la *Mygale pionnière* de M. Walckenaer," it has been placed without further comment in the subgenus *Cteniza*, with the *Mygale pionnière* (*M. fodiens*) and *M. maçonne* (*M. cæmentaria*), by all subsequent writers.

An examination of Mr. Sells's specimens has however convinced me that they belong neither to the sub-genus *Cteniza*, nor yet to the genus *Mygale*, being referable to the genus *Actinopus* of Perty, (*Sphodros* of Walckenaer or *Pachyloscelis*, *Cratoscelis*, and *Actinopus* of Lucas); and most probably identical with the *Sprodros Abbotii* of Walckenaer (Hist. Nat. Ins. Apt. 1, p. 247), so named in honour of the Georgian entomologist, Abbot, who has illustrated it in his drawings under the name of the purse-web spider, (No. 36 of the 14th vol. of his Collections of Drawings in the British Museum Library, No. 7956, Plutarch 126 E.) It is also probably identical with the *Mygale truncata* of Hentz, (Boston Journal of Nat. Hist. vol. iv. No. 1. "Descriptions of Spiders of the United States," Species 1). *Mygale nidulans*, Fab., Walck., if distinct from that of Latrielle, is also most probably a species of the same genus *Actinopus*, which comprises several other species whose economy has not been observed.

Another species of trap-door spider remains to be described, which was forwarded to this Society from Barbary by Mr. Drummond Hay, together with its nest, which likewise belongs to the

same genus as Mr. Sells's Jamaica species, to which it is so closely allied as scarcely to present any specific distinction beyond that of size. The nests which I have seen have been about four inches deep, slightly curved within, about three-quarters of an inch in diameter; the valve at the mouth not being circular, but rather of an oval form, one side, where the hinge is placed, being straighter than the other. The valve is formed of a number of layers of coarse silk, in the upper layers of which are imbedded particles of the earth, so as to give the cover the exact appearance of the surrounding soil, the several successive layers causing it, when more closely inspected, to resemble a small flattened oyster-shell. The mouth of the nest is shelved off at the edge, so that the valve, which is also shelved off at the edge, falls into and upon the orifice, and shuts it far more completely than if the edges of the valve had been cut straight. The inner lining of the nest and of the valve is pure white. The architect of this nest I propose to name

Actinopus ædificatorius.

Piceo-niger, nitidissimus, subtus, cum pilis maxillaribus pallidioribus, abdomine obscuro, fusco sericeo, subtus ad basin maculis 4 luteis, cephalo-thorace in parte postica semicirculariter valdè impresso, pedibus fere æqualibus. ♀

Long. corp. lin. 12—14.

This spider is of a pitchy black colour, and (with the exception of the abdomen), very shining and polished; the abdomen (which is considerably larger than the cephalo-thorax and greatly elevated and gibbose), is obscure, very finely sericeous, and of an uniform dull brown black colour: the legs are clothed with hair and fine bristles of various lengths, and the various joints are connected together by a very pale whitish membrane, which gives them the appearance of being annulated; these limbs are nearly of equal size, but variable in thickness; the palpi are also of considerable length, and have all the appearance of a pair of feet, at least in the female, which is the only sex I have seen either of this or the Jamaica species.

The cephalo-thorax is of an oval form, truncated behind, with a slight elevation in front where the eyes are placed, and a very deep semicircular impression behind the middle, open in front, the part which is behind the impression being lower than that in front of it; the eyes, eight in number, form two lines, four in each, the anterior curved with the eyes at about equal distances apart, the outer pair being largest, the posterior line is longer than the

anterior, the two middle eyes being much wider apart. There is also an impression on each side of the cephalo-thorax, above the base of the third pair of legs, as well as some slighter ones running towards each lateral anterior angle. The cheliceræ are very strong, very much polished above at the base, but very rugose, with sharp short points and hairs on the apical half; the extremity is slightly produced within and rough; the hook is very acute, and falls, when at rest, into a groove armed at the sides with about six pairs of acute short tubercles, gradually diminishing to the tip. The maxillæ are slightly produced on the inside, where they are very hairy and armed with many small pointed rugosities; the palpi are long and pediform, the first joint has a transverse elevation across the middle on the inside, which gives it the appearance of a distinct joint; the second joint is very much compressed and bent, and is the longest of all the joints; the next is short; the fourth twice as long as the preceding, compressed, broader, and armed at the edges with hairs and minute but strong pectinations; as is also the fifth joint, which is much shorter and gradually narrowed to the tip, where it is armed with a simple single unguis, having a minute tooth at the base. The first and second pairs of legs are very similar in their structure to the palpi, except that the fifth joint, which corresponds with the fourth joint of the palpi, is succeeded by two joints agreeing unitedly in shape and armature with the fifth joint of the palpi, but terminated by two ungues, each of which has a strong tooth near the middle. The third pair of legs, on the contrary, is of a structure quite unlike the preceding, being very robust, the third joint being very much thickened and swollen beneath, the fourth, fifth and sixth joints being especially thickened at the tips, in no wise flattened but armed with strong short acute tubercles, as is also the terminal joint, which is armed at the tip with two ungues agreeing in structure with those of the fore-legs. The hind pair of feet is also different in its structure from any of the others, being more regularly cylindrical and less powerfully armed than the third pair; the terminal joints especially are more slender, but the ungues are similar to those of the other feet. All the legs have the terminal joint thickly clothed with short hairs, but these do not prevent either the short acute tubercles or the ungues from being seen. The sternal plate is somewhat oval, flat, and highly polished, its anterior part having the labium (languette, Latrielle), attached to it, which is distinct, horny, semi-ovate, hairy and obtuse in front; this fits exactly between the base of the

maxillæ, and between it and the base of the cheliceræ I observed a minute oblong deflexed tonguelet of a membranous texture, which seems analogous to the hypopharynx of insects; it is of a membranous texture, and was observed without dissection or the slightest difficulty. I presume this is the part which Latreille names the camerostome. It is impossible on examining the locomotive appendages of this insect not to be struck with the conviction that the maxillæ are but a modified pair of feet. If we examine the hind pair of feet, for instance, we find a short piece articulating with the sternum, which is analogous to the coxa of insects; this is succeeded by a still smaller piece, which is as evidently the trochanter; then comes the most powerful joint of the foot, which is the femur; then is there another short joint which seems to constitute, with the following, the tibia; and these are followed by an apparently two-jointed tarsus, thus making seven joints in the foot, the number ordinarily assigned to the legs of the *Arachnida*. In the system of M. Savigny the names given to these joints are as follows:—

1.—La hanche		=	the Coxa	of the feet of Insecta.
2.—La exinguinal 3.—Le fémoral	composing la cuisse	=	the Trochanter the Femur	
4.—Le génual 5.—Le tibial	composing la jambe	=	the Tibia	
6.—Le metatarse 7.—Le tarse	composing le pied	=	the Tarsus	

Now the maxillæ and their palpi, as indeed Savigny has long ago shown, are but a pair of modified legs. If we therefore consider the maxillæ as the basal joints or the coxæ of a fore foot, we shall find that the first and the four following joints of the palpi correspond, joint for joint, with the same joints of the foot, in extent of development. The difference takes place in the palpi having a joint less at the end than the feet; by comparing, however, the palpus and the first foot of this insect, it is quite evident that the last joint of the palpus is composed of the two terminal joints of the foot soldered together.

We thus arrive at the following correspondence between the joints of these two members:—

FEET.		PALPUS.
Coxa, or	La hanche, *Sav.*	Maxilla.
Trochanter, or	L'exinguinal, *Sav.*	1st joint (Article sous axillaire, *Sav.*)
Femur, or	Le fémoral, *Sav.*	2nd joint (Huméral, *Sav.*)
1st joint of the Tibia	Le génual, *Sav.*	3rd joint (Cubital, *Sav.*)
2nd joint of the Tibia	Le tibial, *Sav.*	4th joint (Radial, *Sav.*)
1st joints of the Tarsi	Le metatarse, *Sav.*	5th joint (Digital, *Sav.*)
2nd joints of the Tarsi	Le tarse, *Sav.*	5th joint (Digital, *Sav.*)

Such is the correspondence between the feet and the palpi of the females of this genus, but the males form a remarkable exception to the general character of the class, being in fact the only spiders which have six joints in the palpi, in addition to the maxilla, or seven in all, as shown by M. Lucas in his valuable memoir on this genus (in the "Annales de la Société Entomologique de France," 1837, p. 379). The same author, in his memoir on the genus *Hersilia* (in Guérin's Mag. de Zool. class 8, pl. 12 and 13), also showed that that genus was anomalous in possessing eight joints in the feet, instead of seven, the usual number, the tarsi being composed of three joints instead of two. He consequently gave to this extra joint of the tarsus the name of Le mesotarse, placing it (as its name indeed implies) between the metatarsus and the tarsus, and in order to establish the correspondence between the joints of the foot of *Hersilia*, and the joints of the palpus of *Actinopus* ♂, he proposed the following modifications:—

PALPI.	PIEDS.
Machoire correspondant à la	Hanche.
Art. sous axillaire (*Sav.*)	A l'exinguinal (*Sav.*)
Huméral (*Sav.*)	Au fémoral (*Sav.*)
Cubital (*Sav.*)	Au génual (*Sav.*)
Radial (*Sav.*)	Au tibial (*Sav.*)
Metadigital (*Lucas*)	*Au mesotarse* (*Lucas.*)
Digital (*Sav.*)	Au tarse (*Sav.*)

I cannot, however, exactly agree with M. Lucas that it is "facile de voir que les articles qui composent les organes de la manducation correspondent entièrement à ceux de la locomotion," there being eight joints in the feet of *Hersilia*, and only seven in the palpi of *Actinopus* ♂. M. Lucas has indeed added "le metadigital correspond au mesotarse et enfin le digital sur le dernier article (of the palpi) est le correspondant du tarse, qui se compose ordinairement de deux articles, le metatarse et le tarse;" thus increasing the difficulty by placing his new joint, the mesotarse, or middle joint of the tarse, before the basal joint, or the metatarsus.

By taking a more generalised view of the matter I have no doubt but that we shall arrive at a very different conclusion from that obtained either by Savigny or M. Lucas. The structure of the female palpus, as above stated, evidently corresponds with that of the feet, the two terminal joints of the feet being soldered together in the palpi of the female. This supposition receives full corroboration, by the fact that the male palpi have the two terminal joints distinct, as stated by M. Lucas.

Now it will at once be perceived that the number and form of the joints of the palpi, thus developed by the addition of another joint, exactly correspond with the ordinary condition of the feet of the spider, that is, in possessing seven joints. We have, therefore, to inquire into the anomaly of the genus *Hersilia*, and I think I shall have no difficulty in proving that that genus has but the typical number of joints. In carefully examining the ungues of *Actinopus* while alive, I observed arising at the base of and between the ungues a separate single minute spur, moveable with them, and arising from a distinct moveable fleshy joint at the end of the last joint of the foot. Thus the mode of insertion of these ungues is totally different from that of the ungues of, for instance, a beetle; since here they have a united motion, for by touching the basal spur alone they are set in action. Here then we have, as it appears to me, the analogue of the additional joint of the foot of *Hersilia*, which instead of being a mesotarsal joint, as at first supposed by M. Lucas, or as preceding the metatarsus as subsequently considered by him, is shown to be an additional *terminal* joint. The following summary of these analogies and "concordances" will therefore place the subject in a clearer light, and get rid of all the supposed anomalies both in the palpi of *Actinopus* and feet of *Hersilia*.

Foot.		Foot.	Foot.	Palpus.
1. Coxa		or Hanche, *Sav.*.	.....	Maxilla.
2. Trochanter.		or L'exinguinal . *Sav.*	.....	Art. axillaire.
3. Femur		or Le fémoral, *Sav.*.	.....	Huméral.
4. 1st joint .	of the	or Le génual, *Sav.*	.....	Cubital.
5. 2d joint. .	Tibia,	or Le ubial, *Sav.*	.....	Radial.
6. 1st joint .	of the Tarsus,	or Le Metatarse, *Sav.*	Metatarse, Lucas, in Guér. Mag. de Zool. Mesotarse, do., in Ann. Soc. Entom. de France. . . .	Metadigital, *Lucas*, ordinarily soldered with the digital, but separated in *Actinopus* ♂.
7. 2d joint. .		or Le tarse, *Sav.*	Mesotarse, Lucas, in Guér. Mag. de Zool. Metatarse, do., in Annales . .	Digital, *Sav.*
8. 3d joint. .		or Pseudo-tarsus, Westw, ordinarily concealed, but developed in *Hersilia*	Tarse, Lucas, in Guér. Mag. de Zool. and in Annales. .	Pseudo-digital, *Westw.*, always concealed in the females, but probably transformed into the exciting organ of the male.

The correctness of these views seems to be confirmed by the circumstance that the palpi of the male *Actinopi*, in addition to the extra or seventh joint, noticed by Messrs. Perty and Lucas, have the male exciting organs developed at the extremity of this seventh joint, under the form of a globular joint and hook, as represented by Lucas in his figure 5, (Ann. Soc. Ent. Fr. t. vii. pl. 13), which figure is alone sufficient to lead us to the conclusion, that K and K constitute an additional joint, armed with a single hook, answering perfectly to the short fleshy unguiferous joint of the feet of the female *Actinopi*, or to the terminal developed joint of the foot of *Hersilia*.

There still remains to notice another anomalous genus described by Mr. MacLeay, under the name of *Otiothops*, as an example that the feet may, on the other hand, occasionally assume the ordinary number of joints of the palpi, the fore legs of that genus having only six joints instead of seven: it is always difficult to reduce these remarkable forms to the typical structure, but judging from the figure of the foot detached, it would appear that the coxa and trochanter have become soldered together, the second joint being represented as very large, and having all the appearance of a femur.

A few remarks upon the habits of the *Antinopus ædificatorius* will conclude this memoir. These will be confined to the slight observations I have been able to make upon the individuals since they have been in the possession of this Society. I regret that these observations must necessarily be scanty, owing to the lateness of the season when they arrived. Two nests were forwarded, each of which contained a living female. Flies were given to them, or rather were placed in the nests by raising the valve, which the spiders devoured. Occasionally it required considerable force to raise the valve, in which cases it was found that the inhabitant had seized it with the hooks of the cheliceræ, the ungues of the palpi, and of the four fore legs. On examining the undersurface of the valve, its surface presents many minute elevations, but there are none of the minute impressions arranged in a semicircle, as described by M. V. Audouin on the underside of the valve of *M. fodiens*. Our spider contented itself with thrusting the acute points of its cheliceral hooks and ungues into the meshes of the very fine silk, neither did the insect apply the rugose extremity of the cheliceræ to the undersurface of the valves, and with all deference to M. V. Audouin, I do not believe it possible that *M. fodiens* can introduce into the "trous de

son couvercle *les épines* et les crochets cornés dont sont munies ses maçhoires." The extremely powerful and rugose structure of the third pair of feet immediately suggests the idea, that whilst the preceding feet are employed in holding down the valve, this pair of feet is used in holding the spider at the upper part of its nest, their strong muscles, by being forced downwards, preventing the spider from being drawn upwards; and hence it is of much greater importance that this pair of feet should be strong rather than the hind pair. Sometimes after disturbing the spider I found that it spun itself in its nest by fastening the loose side of the valve to the lining of the cell. After some time I found a number of young in one of the nests; these were of a very pale colour, their motions were very slow, and they were constantly observed upon the inner lining of the nest, and never on the back of the spider.

P.S. (July, 1842.) The Baron Walckenaer, in his supplement to the second volume of his "Histoire Naturelle des Insectes Aptères" (p. 440), after noticing the identification established by me in the preceding article (an abstract of which appeared in the "Annals of Natural History" shortly after it was read before the Entomological Society) between *Mygale nidulans* and the genus *Actinopus* (or *Sphodrus*, Walck.), and the probable identity which I suggested might exist between the *M. nidulans* and the *Sphodros Abbotii*, both being natives of new world, adds, however, "mais nous sommes surpris de trouver une *Théraphose* de ce genre en Barbarie. N'y ait-il pas erreur dans la provenance pour cette dernière espèce? ou est-il bien vrai qu'elle appartienne au genre *Sphodros?*"

The description given in the preceding memoir of my new species will, I think, sufficiently answer the latter of these questions in the affirmative. The former will, perhaps, be best answered by transcribing the original letter forwarded to this Society with the living insects themselves.

"7th October, 1839.

"Sir,

"Mr. Drummond Hay, H. M.'s Agent and Consul-general at Tangiers, has requested me to present the Entomological Society with two specimens of the mason spider, with their nests. I have every reason to believe that these insects are alive, but of course

they will require feeding with flies ; but great care must be taken in doing this, in opening the door of their cell.

"I have the honour to be, Sir,

"Your most obedient servant,

"W. G. Chapman."

"The Secretary of the Entomological Society."

DESCRIPTION OF PLATE X.

Fig. 1.—*Actinopus ædificatorius* of the natural size.
2.—The same seen sideways.
3.—The front of the body with the legs cut off at the base.
4.—The mandible and front of the cephalo-thorax with the legs removed to show the parts of the mouth.
5.—The front of the body seen from above.
6.—The chelicera seen from beneath.
7.—The maxilla and basal joints of the palpus.
8 & 9.—The terminal joint of the palpus seen in different positions.
10.—The underside of the front of the body.
11.—One of the first and second pair of feet.
12.—The ungues of these feet.
13.—The third pair of feet.
14.—The terminal joints of this foot.
15 & 16.—The ungues of these feet in different positions.
17.—The fourth pair of feet.
18.—The ungues of these feet.
19.—The abdomen seen from above.
20.—The abdomen seen from beneath.
21.—A minute membranous flap between the base of the spinnerets.
22.—The outside of the orifice of the nest, with the door closed.
23.—The underside of the trapdoor.
24.—The top of the nest, with the trapdoor partly open.
25.—The same, with the spider pulling the door down.

XXVI.—*On the Habits, and on the Structure of the Nests of Gregarious Hymenoptera, particularly those of the Hive Bee and Hornet. By* George Newport, Esq., V.P.E.S.

[Read 1st April, 1839.]

The frequent discussions that have arisen at the meetings of the Entomological Society, on the habits as well as on the structure of the nests of the *Hymenoptera*, have induced me to detail the results of my own observations on these interesting insects; and, although some of the facts I am about to communicate on the hive bee have already been observed by Huber, Bevan, and others, I trust that they may still merit attention, from the testimony which they bear to the general correctness of the observations of those distinguished naturalists.

Of the *Honey Bee*.—On the 27th May, 1836, one of my hives threw a swarm. During the few days immediately preceding this occurrence, there had been a continuance of cold and brisk easterly winds, and there were no signs of swarming on the morning of the present day, although there had been symptoms of such an occurrence during some warm weather about ten days previously. At ten o'clock in the morning the temperature of the atmosphere was 61.5 Fahr., and that of the hive only 92 Fahr. But the weather was then rather cloudy, with light easterly winds, and occasional glimpses of sunshine. At midday it was fine, but windy, and the males and many bees were flying around the hive, but there was nothing more remarkable on this occasion than on some preceding days. At two o'clock in the afternoon the wind had subsided, there was a dead calm, and the sky was perfectly clear. At half-past two the bees swarmed suddenly, but after hovering for a few minutes in the air, settled on a branch of an espalier apple tree, about thirty feet from the hive, and from which they were immediately taken into a glass hive prepared to receive them. The temperature of the hive which the swarm had just left was then only 96 Fahr., and at sunset at eight o'clock on the same evening it had sunk to 85 Fahr. At that time the new swarm was perfectly quiet, and the bees were suspended in a great cluster from the top of the glazed hive, which I then removed to the bee house. At the expiration of an hour all was still quiet, and there was not a single insect ventillating at the entrance hole or in any part of the hive, every bee having joined the cluster. At half-past six on the following morning, May 28th, I again

visited the swarm, but not a single bee was yet engaged in the act of ventillation, either within the hive or at its entrance. They were still hanging from the top in a great cluster of festoons, the whole being gently agitated by a constant, uniform, wavy, or pendulous motion, and were perspiring very copiously. The temperature of the external atmosphere was only 52 Fahr. Not a single bee had yet left the swarm since it was hived. At seven o'clock the first bee came to the entrance hole, and, after examining it attentively, left the hive. Having taken two or three circular flights around the bee house, at a little distance in the air, as if to survey the spot, it flew entirely away. A few minutes after this another bee left the hive in a similar manner; but, after flying around the bee house two or three times, flew directly to the spot where the swarm had settled on the preceding day. Several other bees left the swarm in like manner, and flew to the same spot, and many of them continued flying around in the air for a considerable length of time. In about ten minutes one of the bees returned to the swarm, and having surveyed the entrance hole, flew to the entrance hole of the next hive in the same bee house, reconnoitred it, returned again to the swarm, and back again to the entrance of the other hive, and then again departed. From this and similar proceedings of these insects, I was led to the inference that it is by means of vision chiefly that the bee discovers its way back to the hive it has left, and distinguishes its own hive from others; and this opinion is further supported by the fact that bees occasionally mistake one hive for another, within the first few days after swarming, or when the hive has been removed to a little distance from a spot on which it has originally been placed, as was the case with many bees of this swarm, which entered the adjoining hive, apparently by mistake. This occurred frequently during the first two days after swarming, and the result of this error on the part of the swarmed bees was that there was much fighting before the hives, on this and the following day, until the intruders had ceased to mistake the proper entrance to their own dwelling.

Although I was unable as yet to discover any comb within the hive which contained the swarm, owing to the crowding of the bees around it, I was satisfied that a portion of comb had already been made, since a number of bees were continually separating themselves from the cluster with little transparent scales of wax in their mouths, and, forcing their way into the mass, were quickly lost sight of. At eleven o'clock there was much activity in the swarm, and one or two bees were now for the first time engaged

in ventillation at the entrance hole, and many others were busily employed in removing from the floor of the hive a quantity of coarse brown sugar, which I had strewed over it, thinking that in the event of unfavourable weather it would be acceptable to them; but this was not the case, they were evidently annoyed by its presence, and laboured very hard in removing it from the hive, so that on the following day the ground beneath the alighting board was thickly strewed with little masses of the ejected sugar. At nine o'clock on the following morning, May 29th, having constantly watched the swarm during this and the preceding days, I first saw a bee enter with pollen; thus giving further proof that the combs were in some state of forwardness, and that the queen had probably begun to deposit her eggs in them; and on the afternoon of the present day I had the satisfaction of observing a large piece of comb suspended from the upper part of the hive, upon which the bees were working very assiduously. In the afternoon of the first of June, exactly four days after the swarm was hived, I observed two large pieces of comb, of the most delicate whiteness, suspended side by side from the middle of the hive, from which the bees were hanging in great clusters. The quantity of comb continued daily to increase, and on the 17th of June, exactly three weeks from the hiving of the swarm, there were five beautiful combs, which nearly filled the interior of the hive. The middle comb was the largest, the two outer ones the smallest, and the others of an intermediate size, between the middle and outer ones. It was thus evident that the formation of comb had commenced in the middle of the hive, in the centre of the clustre, and that the foundation of the combs on each side took place subsequently to that of the middle one. As the combs were constructed at right angles with, and their edges afterwards made to touch, the glass window at the back of the hive, I had an excellent opportunity of observing the progress of the work. Although I have never seen the actual foundation of a comb, owing to the crowding of the bees, I have constantly observed the manner in which new cells are commenced adjoining others which are in the course of formation. Whenever the bees are about to form a new cell, they commence by extending the base or partition between the cells of the two sides of the comb. In doing this I have usually observed a bee at work on each side, one bee extending the base of a new cell on one side of the comb, and another employed in like manner on a portion of that on the opposite side. That portion of the wall of the future cell which is nearest to the comb is then a little elevated, while other bees

are at work deepening the cells already partially formed, by the addition of new materials around the edges of the walls. Thus the comb is always edged with little shallow cups, the basis of new cells, which are either only partially or completely formed, between which and the completed cells there are always one or more rows in an unfinished state; that wall of each cell which is nearest to the centre of the comb being the most finished. It is thus evident that the bees always work from the centre to the circumference of the combs, and the cells on one side regularly correspond with those on the other. But it sometimes happens that two portions of comb are commenced at a distance from, but in a line with, each other, and cells are added to each until the two are united together. When this is the case it usually happens that one of these pieces is nearly completed before the other is hardly commenced, and the rows of cells in one of them differ in direction from those in the other, so that where the two pieces are united (as in the combs now produced) there are necessarily some irregularly formed and imperfect cells, some of them being much smaller, and others much larger, than usual. In one of these specimens the enlargement of one or two cells results from the union of two unequal portions of a cell in each piece of comb; and in the other instances in which the form of some of the cells is pentagonal, and even quadrate, that it results from the space between the two pieces of comb to be united being too small to admit of the formation of perfect cells. It also happens occasionally that the rows of cells on one side of a comb have a different direction from some of those on the opposite, although there is scarcely any difference in the size of the cells on the two sides. This occurrence I believe is exceedingly rare, and gives rise to a curious circumstance which is well shown in one of my specimens, namely, the formation, not of the usual rhomboid pyramidal bases to the cells, nor of any of the transitionary forms, which occur in combs when the large male cells are constructed near the common sized ones for working bees, but of *perfectly flattened bases* to many of the cells, without the slightest angle. In these cases the walls of the cells on one side of a comb exactly correspond to those on the other. Some of these circumstances have already been noticed by Huber, Dr. Bevan, and others, but they are exceedingly curious and merit further investigation.

When a comb is constructed at right angles with the glass window of a hive, it affords an excellent opportunity of witnessing the manner in which the bee unites the new wax to the old, when enlarging or founding a cell: and when the bee is working in a

cell, one side of which is made to abut against the window, and is in such a position as to expose the under surface of its body, the whole of its proceedings are easily watched. It first reduces into small pieces the little transparent scale of wax which it brings in its mandibles, and mixing these with a quantity of saliva makes a soft and opaque mass, and then immediately begins to unite this new material with the wax of the cells, by kneading it like dough with its mandibles, and, as this new wax becomes more ductile, it draws it through them in the form of a thin riband, as noticed by Huber and Dr. Bevan, until it is sufficiently softened for use. It then spreads it out, and moulds it into form with its flexible labium and maxillæ; and during the whole time it is thus engaged the bee constantly employs its antennæ in feeling, as it were, the shape of the kneaded mass, and ascertaining the progress of the work. At the moment of spreading it out the new wax is often so much softened by its admixture with saliva as to form a kind of thick paste, which appears to dry rapidly. This has been noticed by Bevan, and any one may satisfy himself of the fact on inspecting a cell that has one of its sides formed by the glass window; he will then also observe that in the angles formed by the approximation of the bases of the cells of the two sides of the comb, there is usually a little interspace, which is not filled up, and in which the wax that forms the basis of the cells has a roughened appearance, like unfinished plaster-work. This circumstance leads at first to the opinion that every cell is formed of distinct walls, as formerly stated by Dr. Barclay; but this opinion has been disputed, on the fact that it is only in old combs that the cells are distinctly separable, and in those it is believed to arise, not from the actual existence of distinct walls to each cell, but from the accumulation within them of the cocoons spun by the larvæ. But whether the walls of the cells be indeed double or single I have always found the interior of the cells of a new made comb, in which no larvæ have been hatched, perfectly smooth, like those which have contained larvæ, and also lined with a delicate pellicle. The combs I have examined were those of a maiden swarm, every cell of which was lined with a distinct membrane, not excepting even those cells which were unfinished, on the edges of the combs, and in which, of course, no larvæ could ever have been developed. In order to assure myself of this fact, I cut off one row of unfinished cells, and one row which was only just commenced, and placed them in hot water, in which they were allowed to digest for at least a couple of hours, at a temperature very little below 212 Fahr. The wax of the cells became completely dis-

solved, but many remnants of the membrane floated on the surface of the water. The experiment was repeated with great care, and the result in each instance was precisely the same. I have not yet examined a piece of comb *immediately* after it has been formed, but, from the results of these experiments, am inclined to believe that new comb as well as old will always be found to contain a membrane in each cell, made by the bee herself, before the cell is finished, the use of which probably is to give additional strength to the wax, and to the whole comb. Dr. Bevan and others have remarked, that before the cells are finished the bees give them additional strength by thickening their edges "and covering their whole surface *with a peculiar kind of varnish*, which they collect for the purpose." It is probable that the varnish noticed is, in fact, this lining membrane. This is a subject of considerable interest, but it is not without its parallel in the economy of other species. The mason bee plasters round the interior of its cell with a secretion of its own, before it collects pollen and honey as food for the future larva; and the sand bees, *Colletes*, as is known to every Entomologist, form in their burrows a succession of transparent, membranous, cylindrical cases, which are stored with pollen before the eggs are deposited in them. This is an additional circumstance in support of the opinion, that each cell of the honey-comb is lined with a distinct membrane.

Of the *Hornet*.—The proceedings of the hornet, *Vespa crabro*, in constructing its nest, are somewhat different from those of the hive bee. The whole base of a cell appears always to be completed by the insect before the sides are begun to be raised upon it. On the 24th of June, 1828, I discovered a hornet's nest that had just been commenced between the lining and weather-boarding of the side of an out-house, in such a situation as enabled me, on removing a portion of the latter, to examine the interior of the nest, and watch the proceedings of the insect. The nest of the hornet, like that of the wasp, is always founded by a single individual, and is commenced by the formation of two or three cells attached to a pedicle. The nest in question was formed of only one comb of hexagonal cells, arranged in a circular horizontal plane, suspended by its pedicle. There were fifteen cells, either completed or in different stages of forwardness, and also the basis of five others, on the edges of the comb, just commenced. The whole was inclosed by an outer wall or covering, about the size of a large orange, but open on the under surface. In each of the four middle cells was a large larva, apparently about four or five days old, and in the outer cells either a newly hatched larva or

an egg. The insect was very assiduous in her attentions to the nest, and was quite unassisted in her work, none of her progeny having yet passed the state of larvæ. She appeared to be most engaged in deepening the cells in the early part of the day. The material made use of for this purpose was rotten wood, which I constantly observed her collecting from a rotten wooden paling which was so decayed as to have been completely reduced to touchwood. On one occasion, when she had returned with a quantity of material, she was busily employed in the nest for nearly an hour, during which time I was engaged in watching her proceedings. She first passed her head into each of the cells that contained the largest larvæ, as if to feed them, and then, having examined the others, began to increase the depth of the two outermost cells by applying new material to their edges. Finding the comb unsteady on its pedicle, she passed to the top of the nest, and was hidden from view for a long time, occupied, as I suspected, from the subsequent greater steadiness of the comb, in strengthening the pedicle. When she had been thus employed for about twenty minutes, she returned to the surface of the comb, and was engaged for a much greater length of time in deepening the two or three outer cells, to the extent of at least a line each, which was effected by the addition of the masticated wood reduced to a pulp, and applied in thin layers to the *edges* of the cells. When she had finished these she began to work in a similar manner upon the edges of the outer covering of the nest, adding layer after layer, but more irregularly, and of coarser materials, so that her mode of proceeding was particularly evident in this structure. On the following morning at ten o'clock the cells had been still further enlarged. A larva had also been hatched in one of the outer cells during the night, and in the course of the day three new cells were commenced. On the morning of the 28th the number of cells had been increased to thirty-two, and the old ones had been much deepened. The larvæ in the middle cells were now more than treble their size when I first saw them, and afforded me an opportunity of observing the manner in which they maintain themselves in their cells; which are suspended vertically, with the open mouths downwards. They do this by a constant vermicular or turning motion of the body, so that each larva is incessantly changing its position in the cell. When this motion has carried it towards the entrance or mouth of the cell, the larva makes a sudden longitudinal contraction of its whole body, by means of which it is carried backwards and upwards, and thus regains its position at the base of the cell, from which its constant

vermicular motion is tending to remove it. I was now prevented from pursuing my observations any further, the parent insect being accidentally killed. I had, however, observed enough of its proceedings to feel assured that in this instance at least the partition between the cells is not double, but that the walls of one cell are common to all that surround it. Whether the hornet lines the interior of its cells with a membrane, as is done by the hive bee, I have had no opportunity of observing.

On examining the nest of that interesting little tree wasp, *Vespa Britannica,* it is evident that it is formed in exactly the same manner as that of the hornet. Very distinct layers of material are seen in the outer coverings, and the walls of the cells are so thin that its structure can hardly be questioned. From an examination of the cells of the common wasp, some months since, I was disposed to think that they were formed of several distinct layers, which are easily separable; but from the fact that this is not the case in the cells of the hornet, or of the tree wasp, the appearances then observed were perhaps occasioned by the cocoons left by the larvæ, which may easily be mistaken for separate walls. Respecting the kind of material employed by the common wasp, in the construction of its nest, there appears to be some difference of opinion. Reaumur states that the wasp procures its material from decayed timber, like the hornet; but White, of Selbourne, and Kirby and Spence, assert that hornets alone obtain it from rotten or decayed wood, while the wasp procures it from *sound* timber. From my own observations I can state most positively that the wasp procures, at least, some portion of the materials it employs from *rotten* wood, as I have many times witnessed during the last summer. I saw both the common wasps, and the hornet upon which I made the above observations, busily engaged at the same moment in obtaining materials from the same piece of rotten wood. The wasps even penetrated into the soft wood in several places to procure the material. But I have also seen the wasps, as many others have done, procuring it from the solid wood of a window-framing; although it must be remarked that the wood in this instance also has been that which was somewhat affected by the weather.

XXVII.—*Observations on some Mummied Beetles taken from the inside of a Mummied Ibis. By* Rev. F. W. Hope, F.R.S. &c.

[Read March, 1840.]

The fragments of mummied insects taken from the inside of a Mummied Ibis, and sent to me by Sir Gardner Wilkinson, and which I have carefully examined, belong to two genera. The first is *Pimelia pilosa* of Fabricius, or, according to a more modern arrangement, a *Trachyderma* of Latreille. The second is evidently the body of *Akis reflexa*, Fab.; both the above insects are met with at the present day in Egypt in great abundance. Of the former species there are nearly two entire specimens, with the exception of the antennæ; there were also found the thorax of other individuals, with sundry limbs of other insects. I may here remark, that this is not the first time I have met with the occurrence of *Trachyderma pilosum;* there was in the British Museum, a year back, a specimen of this insect fastened to the case of an Egyptian mummy, and most likely it may still be seen in statu quo, unless some of our friendly indigenous insects have devoured it, tempted by such an unusual exotic luxury. I must here note, that both species of beetles are invariably black when arrived at maturity; consequently the reddish pitchy colour which is apparent by day is attributable to the medicaments used in embalming, and not to immaturity; and the present instance, therefore, may be taken as corroborative evidence of what I have previously stated when describing the mummied insects which Mr. Pettigrew kindly submitted to my inspection.

With respect to *Akis reflexa*, this is the first time I believe it has ever been recorded as found in a mummied state; from its abundance in Egypt at the present day (as I have repeatedly received it in different collections from that locality) we may conceive it to have been equally abundant at the period when these specimens were embalmed.

It is not my intention here to enter into the dispute relating to the identity of the Ibis; Hasselquist regarded it as an *Ardea*, while Baron Cuvier calls it a *Numenius:* it appears to be satisfactorily ascertained that there are two species of Ibis which are met with in an embalmed state, and both, I believe, belong to *Numenius*. The Ibis is reported to feed on serpents, and devours voraciously reptiles and insects; probably, therefore, it was worshipped partly on account of its useful services in destroying

such animals, when the waters of the Nile decreased, but chiefly perhaps because it was one of the signs of the zodiac, and, like other asterisms, was venerated accordingly. With regard to the above-mentioned insects found in the body of the mummied Ibis, I suspect they were devoured whole by the bird when living, and that it happened to be killed before they were decomposed; I cannot for a moment think the beetles were separately embalmed, and then placed in the inside of the Ibis. Had the beetles been found in a vase, or together with the bird in cases of wood or stone, or in the envelopes which swathed the sacred animals—in all which states Mr. Pettigrew informs us the Ibis is found—there would have been some reason for thinking that the insects were separately embalmed. I may here add that Baron Cuvier states, that he found in an embalmed Ibis the remains of serpents, of which the skin and scales had not been digested; and why, I ask, may not undigested insects, as well as relics of *reptilia*, be found in the intestines of the Ibis. It is remarkable that the passage which I have quoted from Cuvier is disputed by the learned Savigny, the latter endeavouring to prove that the Ibis does not feed on serpents, deducing his conjectures partly from the structure of the beak and tongue of the Ibis, and from the food of other birds of allied species, which feed on shell-fish, worms, fish, and aquatic insects. I have only here to remark, that the Ibis feeds on insects, terrestrial as well as aquatic, and that I side with Cuvier in preference to Savigny. On referring to Dr. Clarke's Travels for information relating to the Ibis, the following passage will be found, which, with a short comment, will conclude these observations:—"Upon the sands around the city of Rosetta we saw the *Scarabæus sacer*, or rolling beetle, (as it is sculptured on the obelisks and other monuments of the country,) moving before it a ball of dung, on which it deposits an egg. Among the Egyptian antiquities preserved in the British Museum there is a most colossal figure of this insect. It is placed upon an altar, before which a priest is kneeling. The beetle served as food for the Ibis. Its remains are sometimes discovered in the earthenware repositories of those embalmed birds which are found at Saccara and Thebes. With the ancients it was a type of the sun, and we often find it among the characters used in hieroglyphic writing. As this insect appears in that season of the year which immediately precedes the inundation of the Nile, it may have been so represented as a symbol of the spring, or of fecundity, or of the Egyptian month anterior to the rising of the water."

Now, without entering into a disquisition on the various points

above stated, I will merely notice that Dr. Clarke thinks that *Scarabæus sacer* was the food of the Ibis, and that his remarks seem confined to that insect. We have, however, now sufficient grounds for asserting that the Ibis fed on other insects besides the *Scarabæus sacer*, for, on examining the insects submitted to me by Sir Gardner Wilkinson, other species have been recognized. Instead, therefore, of applying the above passage to the *Scarabæus sacer*, we must consider that the Ibis fed on various beetles, and not on one particular species. My chief reason for recommending this interpretation of Dr. Clarke's remarks is to prevent an error which might otherwise become general. I have heard it asserted, in direct terms, that the Ibis in a domesticated state fed on the *Scarabæus sacer*. I do not pretend to be learned in Egyptian wisdom. I venture, however, to express an opinion, that it seems most improbable that an Egyptian priest would feed one sacred animal with another considered nearly as sacred; one, at least, in high esteem and veneration throughout the ancient Egyptian empire.

XXVIII.—*Notice of the occurrence of Hybrid Individuals occurring in the Genus* Smerinthus. *By* Mr. Henry House. *In a Letter addressed to* W. Raddon, Esq.

[Read 6th November, 1837.]

Durdham Down Nurseries, Sept. 29th, 1837.

Sir,

In compliance with your's of to day, I beg to state, that the idea of an hybrid between *Smerinthus ocellatus* and *populi* originated in my mind about ten years ago, and from that time till the present I have adopted every method that my fancy could devise to bring about my experiment; at length, wearied with unsuccessful effort, I determined if I did not succeed this season I never would try again.

You know I always keep my subterraneous chrysalides in large garden pots, filled within about two inches of the brim with light sandy loam, hooped over the top with wire, and covered with gauze, leaving a space of eight or ten inches from the mould to the top of the wires. When *S. ocellatus* began coming out, (having them in one of those pots, and *S. populi* in another,) I every evening, before dusk or twilight, took out the females of *S. ocellatus*,

one or two, not more, and put them in the pot with male *Populi*, and vice versâ, and then placed the two pots close side by side in the garden or window for the night, so that the female of each species formed an attraction to its own male, while the male could only gain access to the female of the other species. By this treatment I obtained five broods of eggs of *Populi* impregnated with *Occllatus*, and one of *Ocellatus* impregnated with *Populi;* only about thirty eggs of one of the former broods hatched, about the middle of June last. Nineteen caterpillars I reared to perfection, which went under ground in about a month or five weeks after; and in August last twelve of the moths came out perfect, the other seven are still in the chrysalis, and will, in all probability, come out in May next. The insects thus obtained are as near alike each other as any species that I am acquainted with, and are as nearly intermediate as we can conceive. The power of reproduction is completely lost, as they appear to be as near intermediate between the sexes as between the species; they evidently partake of the nature of both sexes: as proof, every insect of the genus *Smerinthus*, on touching, discharges copiously a fluid, which in the male is pure white, in the female of a yellow or ochre colour. This insect discharged, at the same motion, first the white and then the ochre fluid quite distinct, and this compound discharge was quite uniform in every specimen, which is never the case in any true species or sex. I have often indulged in fanciful ideas respecting this production, but I never conceived of such an unfinished painting as it is; this is not nature improved by art, but nature sadly defaced by art, as the beauty of both species is in a great measure lost.

I took care to provide myself with eggs of both species that should hatch at the same time as my hybrids, for the sake of comparison; in their infant state no difference was observable between them and *Populi*, very little in their second stage, still more in the third, and finally more like *Occllatus* than *Populi;* the chrysalis was as much different from either, and yet as much resembling both, as the moth. Whether such a production has ever been obtained before or not I am totally ignorant, as I have never had the advantage of studying any work on Entomology. I have also several other varieties of similar origin in contemplation, but my leisure time is very limited; and I shall be very glad to hear that some gentleman of leisure has produced a brood between a male *Populi* and female *Ocellatus* by this day twelvemonth.

XXIX.—*Description of a Hybrid* Smerinthus, *with Remarks on Hybridism in general. By* J. O. Westwood, F.L.S.

[Read 1st January, 1838.]

The account given by Mr. House in the preceding article, of the production of hybrid specimens by a forced union of *Smerinthus ocellatus* ♂, and *Populi* ♀, is especially entitled to observation, as being the first recorded statement of any satisfactory result arising from such an adulterous marriage, as this unnatural union between two distinct species of insects has been not unaptly termed, in this class of animals.

The following is a precise description of the appearance of one of these hybrids, which, in conjunction with the figure of it, which I beg to offer to the Society, exhibiting the upper and under view of the wings, will give an idea of its peculiar relations to each of its parents. (See Plate XI. fig. 1.)

The two specimens which I have examined would, from the form of the body and the pectination of the antennæ, be regarded as male insects. The expanse of the wings in both is three inches. In the outline of the wings the character is intermediate between the two species, the external margin being nearly similar in its general figure to that of *Ocellatus*, but being notched, although far less strongly, than in *Populi*. The markings of the fore wings are almost identical with *Populi*, the outer margin of the dark discoidal central broad bar is more irregular, and is succeeded by two waved fasciæ, the first of which is less conspicuous than the other. The markings of the hind wings, on the contrary, more nearly resemble *Ocellatus;* the pink colour of the base is however exchanged for the dark ferruginous colour as in *Populi*, extending more generally over the wing than in the latter species. In the place, however, of the beautiful and clearly marked grey, silvery, blue, and black eye of *Ocellatus*, there is a large indistinctly suffused black patch, in which is an obscurely defined dark leaden coloured eyelet. On this pair of wings are no traces of the transverse bars of *Populi*. On the under side the markings of all the wings resemble those of *Ocellatus* more nearly than those of *Populi*, there being four waved fasciæ across the disc of the posterior pair. Moreover the basal half of the fore wings is, as in *Ocellatus*, of the same colour as the base of the hind wings above, being of a dark ferruginous hue, which is far more strongly coloured in one than

in the other specimen. The thorax on the upper side is marked with a large oblong dark mark, but which is neither so dark coloured nor so large as in *Ocellatus*. In *Populi* there is no trace of this mark.

Hence we see, that with the exception of the markings of the anterior wings, there is a far greater tendency to *Ocellatus* (the male parent) than to *Populi* in these hybrids.

In the higher animals the occurrence of hybrids is so frequent as to leave no doubt as to the power of generation between two distinct but allied species of animals: the only question being, whether these hybrids are or are not fertile? a question to be solved only by experiment, and a very careful comparative investigation of the structure of the organs of generation. It is the general opinion that hybrids are not productive, but if, as in the case of the moths under observation, the individuals exhibit all the external characters of one or the other sex, the non-possession of the power of generation must originate in some organic internal deficiency which requires investigation. Instances, it is true, are upon record, of fertile hybrids between the common gander and the Chinese goose (which hybrids had bred between themselves), between the Chinese boar and the common pig, and between two species of geese (*Anas boschus* and *A. acuta*). These instances were mentioned by various naturalists at the Bristol Meeting of the British Association, August, 1836; but they appear to have been considered to have originated in some mistake or oversight. (See Athenæum, 1836, p. 634.)

Mr. Eyton, however, in a more recent communication, published in the Magazine of Natural History for July, 1837, has clearly substantiated some of these, but leaving it in doubt whether or not this fact did not prove that the supposed parent-species ought only to be regarded as varieties rather than species, but leaning to the contrary opinion.

Mr. Eyton has since informed me that he has succeeded in breeding from the hybrids between the common and Chinese geese for three generations.

The same gentleman, on the 12th May, 1835, read some account before the Zoological Society of a hybrid bird, between the cock pheasant, *Phasianus Colchicus*, Linn., and the grey hen, *Tetrao perdix*, Linn., and of which he had made an anatomical investigation. In this instance the specimen, although a female, is expressly stated to have the left oviduct very imperfect, the ovaries very small, the eggs scarcely perceptible and very few in number; the plumage of the bird was also very curious, some parts of it

resembling either sex of both black game and pheasant. It would be very interesting to ascertain whether such a hybrid as this would breed, or whether, unlike the hybrids between the common and Chinese geese, it would be sterile; this information would, in fact, give a further clue to the decision of the question, whether the theory of John Hunter be or be not correct? Still in the vertebrated animals it remains to be proved, after admitting that fertile hybrids may be produced between two closely allied but distinct species, what are the limits to the production of sterile hybrids? Copulation may, from some untoward circumstance or other, take place between two animals widely separated in their natural relations, but there must be some, although yet unascertained, limits to the production of hybrids.

Thus there are already numerous instances on record in which insects of different species, genera and even orders, have been coupled together, and there have been opinions given upon the subject by eminent Entomological physiologists, to each of which it will be interesting to recall the attention of the Society.

In the fourth volume of Germar's Magazin der Entomologie (p. 404—409, translated in Silbermann's Rev. Ent. No. 3,) an account is given, from the observation of Rossi, (published in the Memorie della Societa Italiana, tom. viii. p. 119,) of a connexion between *Telephorus nelanurus* ♂ and *Elater niger* ♀; likewise, from the observation of Müller of Odenbach, between *Chrysomela polita* ♂ and *Ch. graminis* ♀, and *Donacia simplex* ♂ and *Apoderus Coryli* ♀.

Treviranus, also, (Vermischte Schriften, vol. i. p. 22,) cites Voigt's Magazin (f. d. Neusten Zustand der Naturkunde, book ix. st. 3, s. 232) for a similar connexion between a male *Melolontha agricola* and a female of *Cetonia hirta*.

Linnæus, in the last edition of the "Systema Naturæ," p. 587, states, that Müller had observed *Chrysomela graminis* and *Chrysomela ænea* in copulation together, and that he had himself seen *Chrysomela ænea* and *Ch.* (*Adimonia*) *alni* similarly situated. Müller, however, in his work on the *Hydrachnæ*, (Introduction, p. xix.) states, that Linnæus had been mistaken in the former assertion, and that the species which he had thus detected were *Chrysomela ænea* and *alni*. And that he had, moreover, found *Hipparchia jurtina* and *janira* (which at that period were regarded as distinct species, but are now ascertained to be the sexes of the same species) similarly coupled.

Mr. MacLeay also detected a species of *Chrysomela* in connexion with a *Galeruca*. Marsham observed a similar circum-

stance between a *Coccinella* and a *Chrysomela*. And Mr. Yates thus found *Spilosoma erminea* and *lubricipeda* together. The three last named observations were communicated to me by the late Mr. Haworth.

Gistl has also recorded (in the Isis for 1827, p. 625, cited in the Bulletin des Sciences Nat., February, 1828) a similar occurrence between two allied species of *Chrysomela*, *Ch. menthæ* and *Ch. polita*, which he is thence induced to consider as the legitimate sexes of one and the same species; but this cannot be the case, as one of these species, *Ch. polita*, is sufficiently common in this country, whilst the other has never been detected.

Mr. Hope stated at the meeting of this Society, on the 4th January, 1836, that a similar occurrence had been observed between *Blaps fatidica* and *Akis reflexa*.

M. le Comte Saint Fargeau communicated to the Académie des Sciences a notice concerning the genus *Volucella*, the species of which appear, according to this author, to have a kind of binary relationship together, not only in the habits of the larvæ, and in the general appearance of the insects, but also in the fact of their being not unfrequently found united together. Thus he exhibited instances of this occurrence between *V. bombylans* and *V. plumata*, "où les deux sexes de ces espèces jouoient un rôle inverse dans cette action," (Enc. Méth. x. p. 784). He did not succeed in tracing the result of this occurrence, but he mentions that a specimen which he possessed of a *Volucella*, resembling *V. plumata* in the colour of the anterior part of the body, and *V. bombylans* in the terminal segments of the abdomen, seemed to have been the result of such an union, and to prove the fecundating power of the insects under such circumstances.

In the first volume of the Annales de la Société Entomologique de France, various observations are recorded upon the coupling of species hitherto regarded as distinct. Thus, M. Rambur considers that *Sphinx vespertilioides* is a hybrid between *Sph. vespertilio* and *Sph. hippophaes*, and that *Sphinx epilobii* is a hybrid between *Sph. vespertilio* and *Sph. euphorbiæ*. M. Lefebvre also has recorded the observation of two species of *Tortricidæ*, supposed to be specifically distinct, in the act of copulation, but which he is induced from thence to regard as the legitimate sexes of the same species. The same author also mentioned an observation, communicated to him by Treitschke, in which *Zygæna filipendulæ* ♀ was found coupled with a yellow variety of *Z. ephialtes* ♂, which had been observed by Treitschke, who was thence induced to regard the red variety of *Z. ephialtes* as the result of this union,

especially as he had not noticed the union between the red and yellow specimens of *Z. cphialtes*, nor between the red *cphialtes* and *filipendulæ*. M. Treitschke had also observed *Saturnia carpini* and *S. spini* coupled, and had procured three caterpillars from the eggs, which (the caterpillars) were very nearly similar to those of *carpini*, but which he did not succeed in rearing.

M. Villiers also, in the same volume, p. 422, mentions that having found *Z. minos* and *filipendulæ* coupled, the female produced eggs, from which larvæ were hatched, which the author placed in the retired part of a forest where he had never observed any *Zygænæ*, and in the hopes of finding the progeny in the following year, at which time however he found many specimens, but all proved to be *Z. filipendulæ*. These he nevertheless considered to be the result of the observation of the preceding year, although it is evident that no decided opinion could be given upon the circumstance.

M. Stein also, in Oken's Isis for 1835, p. 343, has described a bastard butterfly as he regards it, which he had captured, and which he considered to be the production of an union between *Hipparchia Pamphilus* and *Iphis*.

M. Boksch communicated to the Natural History Section of the German Meeting of Naturalists, held at Breslau in 1833, an instance in which *Melontha hippocastaneus* and *M. vulgaris* had been found coupled. (Trans. Ent. Soc. vol. i. p. iv.)

In the Transactions of our Society (vol. i. Journal of Proceedings, p. 83) instances are mentioned, on the authority of Mr. Shuckard, of specimens of *Osmia* and *Chelostoma* thus found united; and, on the authority of Mr. Hope, of a *Donacia* and *Crioceris*, and of a *Buprestis* and *Elater;* whilst we were assured at the same meeting, by Mr. Scales, of his having observed an attempted copulation between one of the small dragon flies and a *Vanessa urticæ*.

Still more recently Mr. H. Doubleday has noticed the singular occurrence of a copulation between a male *Sphinx ligustri* and a female *Smerinthus ocellatus*, although there were several other individuals of both sexes of the two species at the same time in the breeding cage. (Entomologist, August, 1842, p. 357.)

Such are all the facts which I have been able to discover on record relative to this curious subject. We will, therefore, now notice the opinions which have been given by various Entomological physiologists relative to it, and which not only affect the physiological question of the generative powers of these insects, but also the nature of the claims of many insects, hitherto re-

garded as distinct species, to be considered as such. The celebrated physiologist, Spallanzani, in 1768, published a Memoir, containing suggestions for the instituting of experiments for the production of hybrid insects, with a view of solving the grand problem of generation, which at that period attracted a great share of attention amongst philosophers. His memoir is entitled "Invito a intraprendere sperienze, onde averre muletti nel popolo degl' insetti per tentar di scogliere il gran problema della generazione." A copy of this scarce tract is in the library of the British Museum.

Burmeister (Manual, p. 515) observes, that "it is uncertain whether such mixtures as those detailed above have been productive, but from analogy with the superior animals we might say no; should, however, the copulation of closely allied species actually produce young, these would not be able to unite productively, as is proved by the general rule of analogous instances in the superior animals, yet this, even, is not without an exception. Hence, Gravenhorst's opinion, that from such bastard copulations of allied species many new forms originate, must be totally rejected, exclusive of the view that in case of such a course in nature its beautiful regularity and order would speedily terminate in illimitable confusion, of which, however, there is not the least proof." Now the circumstances recorded by Mr. House enable us to see the extent to which these observations of Dr. Burmeister are applicable. We thus perceive that the copulation of two distinct species of insects is productive—and not abortive—that the progeny of such an union, between two closely allied species, partakes of the specific characters of both species, but that the sexual power is rendered obsolete, and that it is not, except by some rare accident against nature, that such an union takes place. Marsham, however, observes, in the Entomologia Britannica (p. 169), "Ex coitu *Coccinellarum* inter omnes familias promiscuo, varietates plurimas ortæ sunt;" whilst M. Boisduval, on the other hand, in his Monograph in the *Zygænidæ* (p. 5), states, that he had often found *Zygæna filipendulæ* in copula with *Z. peucadani*, and *Zygæna trifolii* with *Hippocrepidis*, that the females had subsequently laid eggs, but these had never hatched, (a circumstance contrary to the observation of M. De Villiers, cited above). He adds, however, "il est possible cependant que quelques uns éclosent dans la nature." In like manner M. Audouin instituted various experiments upon *Coccinella bipunctata* and *C. dispar*, which are often found coupled, but the eggs produced by the female have always proved sterile, a circumstance which he had noticed as many as

six different times. Hence, M. Audouin considers that the result of an accidental copulation between two species is most commonly that the female is unfecundated, and, hence, that nature by this regulation maintains the constancy of the species. (Ann. Soc. Ent. d. France, vol. i. p. 233.) But as *Smerinthus populi* and *ocellatus* are not more nearly united together by affinity than are *Coccinella bipunctata* and *dispar*, it must be evident that some other circumstances, rather than a want of fecundation, caused the eggs of the latter to be unproductive. Nature will, of course, throw every obstacle in the way, not only of the fecundation of the female during such an act, but also of the development of the young in cases where fecundation has even taken place. Moreover, should the latter reach the imago state, the facts before us will, I think, sufficiently warrant us, even without reference to the analogy of the higher groups, in considering that the powers of reproduction are not possessed by the results of such copulation. The dissection, however, of such an individual in a recent state, especially with reference to the condition of its generative organs, and those of its parents, will most clearly settle this question.

With respect to the effects which these observations will necessarily have upon the question of the specific right of many insects to be regarded as distinct species, the subject is of too extensive a nature to be discussed in all its bearings in so short a paper as the present. One thing however is clearly proved thereby, namely, the decided insulation, except on some unnatural occasion, of the various species of insects. We have heard it asked, whether it was to be supposed that a pair of *Carabi*, for instance, previous to coupling, stopped to count the number of punctures or of striæ upon each other's elytra to ascertain that they were the proper individuals between which such an act ought to take place; but we learn that by the law of nature it is only between those particular specimens which constitute the same species that in a state of nature copulation takes place. There are, doubtless, many insects in our cabinets which have remained unique, and it does not now appear improbable that they may have been the result of a copulation between allied species, which a careful investigation would, as in the case of the red and yellow winged specimens of *Zygæna ephialtes* mentioned above, enable us to detect, so far at least as conjecture would permit.

I may further observe, that this question is quite distinct from that of the existence or non-existence of permanent varieties induced by climate or geographical distribution; and that I trust that as the facility for observations has been clearly shown to exist

by Mr. House, some person having leisure will follow up the subject, and by a few well planned experiments still more decidedly prove whether these hybrid productions be or be not sterile, and if not in what manner the generative power is lost.

I have only in addition to notice the singular circumstance, that *Smerinthus populi*, one of the insects which has produced the hybrid now under consideration, is likewise the species most notorious for its hermaphroditism. A notice of the various accounts recorded of the latter fact will clearly prove that the generative organs of this insect (upon which in the early state of existence I apprehend both hermaphroditism and hybridism are dependant) are liable to great aberrations from their normal condition of specific exclusiveness or unique sexuality in the individual.

Cramer figures an hermaphrodite *Smerinthus populi*, Pap. Exot. tom. iv. pl. 398, fig. A.; as does Fischer, in the Oryctographie de Moscou, pl. 11, fig. 1. The specimen was bred in 1809, and destroyed by fire in 1812; the right side was male and the left female. The entire body, "ainsi que les parties génitales," being divided down the middle.

Godart, in the Encyclop. Méthodique, states, that he had found two of these monstrous *Sm. populi* in the neighbourhood of Paris, vol. ix. p. 66.

Dr. Klug, in the Jahrbuch der Insectenkunde, minutely describes another similar specimen of the same insect (vol. i. p. 257), in which the right side was male and the left female.

Curtis also describes one, presented to him by C. K. Sheridan, Esq., in which the right side was also male and the left female, (Brit. Ent. pl. 482); and Mr. Weaver reared three similar specimens, one of which is now in the possession of Mr. Stevens, and is also masculine on the right side and feminine on the left.

Thus there are no less than nine hermaphrodite specimens of *Smerinthus populi* on record, a much greater number than of any other species; and in all, which have been sufficiently described, the male sexuality has been developed on the right side of the specimen.

XXX.—*Description of a Case of Monstrosity occurring in a Specimen of* Dyticus marginalis, *in which a portion of the external marks of Sexual Distinction are abortive.* *By* J. O. Westwood, F.L.S.

[Read 2nd July, 1838.]

It has been remarked that the careful examination of animals in a monstrous state of development, whether of excess or default, is more serviceable in teaching the true nature of animal organization than the investigation of individuals in the normal state. The case of monstrosity now under consideration appears to confirm, in some degree amongst the invertebrata, a theory hitherto founded upon circumstances observed only in the vertebrata. The insect in question is an individual belonging to the species *Dyticus marginalis*, and, judging from the majority of its external characters, is evidently a male insect. It was captured by the Rev. F. W. Hope, in whose collection it is preserved, and to whom I am indebted for an opportunity of examining it.

The external marks of distinction of the male *Dytici* consist in the dilated structure of the four anterior tarsi, the anterior pair of which are moreover furnished with two large and many minute cup-like organs on the under side or sole of the foot, which latter occur also on the sole of the basal joints of the middle feet; and in the smooth and polished surface of the thorax and elytra, the latter of which exhibit also three longitudinal rows of very minute impressed dots. The females have the four anterior tarsi simple and unfurnished, with larger or smaller cups, the sides of the soles being provided with short strong spines; the surface of the thorax is covered with small impressions, and each of the elytra is deeply impressed with ten deep longitudinal furrows, the surface of the elytra being also generally covered with minute punctures, and moreover exhibiting the three rows of larger dots also noticed in the male elytra.

In addition to the sexual distinctive characters mentioned above, there are various others exhibited by the feet of a less important character, which it will be serviceable to notice, especially as I find no completely correct description of them by preceding authors. Mr. Curtis being silent respecting them in his work illustrating the characters of the British genera, and Dr. Erichson (whose otherwise excellent Dissertation, entitled "Genera Dyticeorum,"

has been of great service in the classification of this family of water-beetles, and contains numerous observations on the structural distinctions between the sexes of the types of most of the genera of which it is composed) having overlooked several of these distinctive marks. The anterior tibiæ of the males are much dilated and curved at the base, the inferior external margin from the middle to the tip being flattened, the edges being ciliated and the under edge near the tip and opposite to the large sucker being *furnished with a single spur*, as represented in my Modern Classification of Insects (vol. i. p. 95, fig. 5, 6). In this respect the genus *Dyticus* agrees with *Cybister*, and differs from *Hydaticus*, *Eunectus*, and *Acilius*. The anterior tarsi in this sex are terminated by two spurs equal in size, and *each with a small tooth* at the base within. In the female the fore tibiæ are straight, not dilated at the base, and furnished with two spurs at the tip. The ungues at the extremity of the tarsi are scarcely smaller than, and formed as in, the males. The middle feet have the ciliation, calcariæ and ungues *equal* and *alike* in both the sexes, the tibiæ having the upper edge strongly, and the inner scarcely, ciliated, the calcariæ of unequal size, and the ungues equal, with a small tooth near the base of each. The hind feet are alike in both sexes, except that in the males both the upper and lower edges of the tibiæ and tarsi are ciliated with fine yellow hairs, whereas in the female the upper edge alone is ciliated.

In Mr. Hope's insect the three basal joints of the anterior tarsus on the right side are dilated, but these are not more than three-fifths of their ordinary width, the joints are of nearly equal size and form, being together a kind of five-sided figure. On the underside the basal joint is destitute of cups, except one of moderate size and imperfect structure at the internal angle, the second joint has about four very small ones placed near the sides, but the third joint is more copiously furnished with little cups, but not to the extent nor of the size of the normal individuals; moreover the extremity of each of the three joints is furnished on the underside with a pair of short strong spines; the intermediate tarsus on the right side is of the ordinary masculine structure, except that the three basal joints are narrower than those on the opposite side. On the left side of the insect the anterior tarsus is nearly of the normal form and structure; the three basal joints are however not so broad nor so uniformly oval as in normal specimens, and on the underside the small cups are not so numerous nor so regularly placed, especially on the internal part of the basal joint. The large basal cup, and the moderate sized lateral cup, are of the ordinary

form and structure. The left intermediate tarsus, on the other hand, has the basal joints rather broader than the right opposite foot, but the small cups on the underside are not so numerous as in the right middle foot. The tibiæ in both of the fore feet are dilated at the base, but each is furnished with *two* spurs at the tip, *as in the female;* the ungues in both fore feet are of equal size, and notched at the base within. The upper edge of the middle tibiæ is furnished with long ciliæ, the under edge is also very slightly ciliated; the calcariæ are of unequal size in the middle feet, and the ungues are of equal size and toothed at the base. The hind feet are of the normal form, with the upper and under edges of the tibiæ and tarsi ciliated.

Thus, in respect to the sexual distinctions exhibited by the legs, we find the masculine structure to exist, although not in its full state of development; this imperfection being more especially noticeable on the right side, in which indeed the fore tarsus manifests an approach to the female structure in the short spines on the underside of the basal joints at the tips, and the removal of the little cups from the centre to the sides, so that if the sides of the three basal joints of the fore tarsus on the right side were removed we should have a tolerable representation of the female anterior tarsus. I need scarcely say that this would not occur by treating the ordinary male tarsus in the same manner.

On examining the fore tibiæ, as well as upper surface of the thorax and elytra, we however find more evident proofs of the assumption of the female characters. The thorax is indeed glossy, but an examination of it under a lens shows that its anterior margin is on each side finely punctured, whilst the left lateral margin is also punctured; punctures of the same size are also irregularly scattered in little groups over other parts of the thorax.

The right elytron is impressed close to the suture with four longitudinal furrows extending to the ordinary length of the furrows of the female elytra; the first nearest the suture is broken near its posterior extremity by several raised parts; the second has one break near the tip; the third is the shortest, and is interrupted in the middle; and the fourth is very irregular: the interstices between these furrows are punctured as in the female. The remainder of the right elytron is masculine.

The left elytron has two short furrows near the suture; that next the suture is very short and is several times interrupted, and the second, which is longer, has two long interrupted spaces; near the lateral margin there also exists a deeper furrow much interrupted.

The under side of the abdomen and its extremity are similar to those of the ordinary males.

The theory which this individual appears to authorise us in entertaining is this, that an imperfection of the sexual characters of an individual are occasionally compensated, pro tanto, by the assumption of the characters of the opposite sex. And the circumstance of the assumption of the male plumage by the females of some kinds of birds at an advanced age, and the growth of the beard on the chin and upper lip of aged females, afford some support to this theory. It is true, however, that in these cases the *female* character which has been lost is supplied by *male* characters, whereas the contrary takes place in Mr. Hope's *Dyticus*. It is also true that the neuter hive bee does not support the theory, the neutrality of those individuals being produced by the loss of certain of the characters of the true females, (the inhabitants of the hive having the power to convert a neuter grub into a perfect female or queen bee,) the individuals not assuming any of those of the males. This is, however, an instance of the normal operation of the laws of nature, whereas, perhaps, it would be proper to apply the theory only to true monsters; but if we are to suppose that the theories to be deduced from the study of monstrous productions affords a clue to the real nature of normal productions, such a result ought not to occur, and it is, therefore, with the greater hesitation that I have ventured to suggest it, although the insect in question most clearly warrants it, so far as it is concerned.

DESCRIPTION OF PLATE XI.

Fig. 2. The insect above described of the natural size.

2 *a*, upper, and 2 *b*, under, side of the anterior tibia and tarsus on the left side.

2 *c*, upper, and 2 *b*, under, side of the anterior tibia and tarsus on the right side.

2 *e*, upper, and 2 *f*, under, side of the tarsus of the left middle foot.

2 *g*, upper, and 2 *h*, under, side of the tarsus of the right middle foot.

2 *i*, under side of the anterior tibia and tarsus of the normal male.

2 *k*, under side of the anterior tibia and tarsus of the normal female.

XXXI.—*Description of a Sub-Genus of Coleopterous Insects, closely allied to the Genus* Carabus. *By* G. R. Waterhouse, Esq., Curator to the Museum and Assistant Secretary for the Scientific Department of the Zoological Society.

[Read June, 1840.]

A most interesting carabideous insect from St. Helena having been placed in my hands by the Rev. F. W. Hope for the purpose of publication, I beg leave, by his desire, to exhibit it to the Members present, to point out its characters, and at the same time to apply to it as a specific name that of its discoverer—the celebrated African traveller—Mr. Burchell.

The principal characters of this insect may be thus expressed:—

Family CARABIDÆ.

Genus Carabus.

Sub-Genus Aplothorax.*

Caput satis grande.
Antennæ longæ, et crassiusculæ.
Mandibulæ breviusculæ, robustæ, ad basin subbidentatæ.
Labrum angustum, transversale, anticè emarginatum.
Mentum profundè emarginatum, et dente centrali armatum.
Thorax parviusculus, absque marginibus reflexis, vel foveis, postice angustatus.
Elytra oblongo-ovata, subdepressa, ad apicem rotundata.
Pedes perlongi—femoribus crassiusculis.

This insect is very nearly equal in size to the *Procrustes coriaceus*, and in its general form approaches that group of *Carabi* of which *C. depressus* may be regarded as the type. In the general structure of the mouth, the great length of its tarsi, the sculpturing of the elytra, and in possessing simple notchless anterior tibiæ, it agrees with the true *Carabi*, but it differs from *Carabus* proper in the simple structure of its thorax, which is smooth and convex and has no reflected margins nor foveæ in the posterior angles;

* This name has reference to the simple form of the thorax.

its antennæ are long, and instead of being thick at the base and gradually attenuated towards the apex, as in *Carabus*, are incrassated in the middle; the third joint of the antennæ is longer than in *Carabus*, and is indeed nearly equal to the fourth and fifth taken together, the terminal joint is short. The head is large, and but little narrower than the thorax, which is cordiform, truncated before and behind, has the anterior and posterior angles rounded, an extremely faint dorsal channel, and a smooth and glossy upper surface; its greatest width is near the fore part, and behind it is considerably contracted. The elytra are ample, depressed, rounded at the apex, broadest in the middle, and somewhat suddenly contracted near the thorax: they are rather delicately punctate-striated, and punctures are observable between the third and fourth, and seventh and eighth, striæ; these punctures are confluent with those of the striæ, and divide the interspaces of the striæ, where they occur, into small compartments like the links of a chain, as observable in very many of the true *Carabi*. The region of the suture is somewhat raised, and there is a slightly elevated but broad ridge running parallel with, and at a little distance from, the outer margin of each elytron. The striæ of the elytra are very close together, and so are the small punctures of which these striæ are composed—they are less deep than in *Carabus monilis*. The legs are much longer than usual in *Carabus* proper, and the femora of all the legs (more especially those of the anterior pair) are stout: the tibiæ of the anterior legs are considerably dilated at their apex, and present a concavity on the under side of this portion: those of the hinder legs are densely clothed with velvet-like hairs on the innerside of the apical half, and the four basal joints of the anterior pair of tarsi are provided with velvet-like cushions on the underside.* The maxillary palpi are unfortunately imperfect; the terminal joint of the labial palpi is truncated, but not dilated at the extremity as in *Carabus*.

By those Entomologists who regard *Procrustes* and *Procerus* as genera, the present insect would no doubt be also considered as constituting a genus, but as the nature of the characters which serve to separate these minor groups from *Carabus* I cannot think

* The fact that in *Carabus* proper, as well as *Procerus* and *Procrustes*, the females are distinguishable, among other characters, by the absence of these velvet-like pads, leads us to suppose the present insect is a male; and if so, the anterior tarsi not being dilated, furnishes an additional distinguishing character between the present sub-genus and *Carabus*. In the male *Procrustes* there are but *three* of these padded joints.

are of sufficient importance to constitute genera, I can but regard them as off-sets as it were of the great genus *Carabus*.*

Aplothorax Burchellii. (Plate XII. fig. 1.)

Aploth. niger; thorace cordiformi, anticè et posticè truncato, angulisque anticis et posticis rotundatis, suprà lævi et convexo; elytris punctato-striatis, striis punctisque crebris at non profundis; inter strias tertiam quartamque, et 7-mam et 8-vam, punctis grandioribus cum illis striarum confluentibus.

Mus. Dom. Hope. Habitat apud St. Helenam.

	″	‴
The total length of this insect is	1	$3\frac{1}{2}$
Width of the elytra	0	$5\frac{3}{4}$
Length of head	0	$3\frac{1}{4}$
Width of head	0	3
Length of thorax	0	$3\frac{1}{4}$
Width of thorax	0	$3\frac{1}{2}$

Plate XII. fig. 1. *Aplothorax Burchellii* of the natural size.
1 *a*, labrum; 2 *b*, mandible; 1 *c*, and 1 *d*, upper and under side of the maxillæ;† 1 *e*, mentum, labium, and labial palpus; 1 *f*, antenna; 1 *g*, fore foot.

* The relative number of species, together with their geographical distribution, furnish physiological characters which will hereafter in all probability be taken into consideration, when the value of groups is to be determined.

† [This is the only instance hitherto observed in which such a structure of the apical portion of the maxilla as is exhibited by this insect exists. I was particular in noticing that both maxillæ agreed in this formation.—*J. O. W.*]

XXXII. *Description of a new Genus of Carabideous Insects.* *By* G. R. Waterhouse, Esq.

[Read May, 1841.]

The insect about to be described was sent me for this purpose by A. Melly, Esq., who obtained it from the west coast of Africa, in the Gambia district. As the specimen is unique I shall not have it in my power to dissect the parts of the mouth, most of them however are tolerably well displayed.

The head is elongated, has an almost spherical neck behind, being constricted close to the eyes, which are prominent; the upper surface in front of the eyes is flat, dilated immediately in front of the eyes, so as to hide a part of the basal joint of the antennæ, which is placed in a deep socket, but is contracted again anteriorly; two grooves, each having two or three impressed points, are observable between, and slightly in front of the eyes; these two grooves, which are rather deep, converge in front, where they are joined by two slightly marked grooves which diverge anteriorly and form the posterior boundary of the clypeus, which is broadest behind, and has a distinct impressed point on each side; the anterior margin is indistinctly emarginated—in fact, nearly straight; the labrum is tolerably broad, but in anterio-posterior extent it is very short; it is rather deeply emarginated in front, and the lateral projecting lobes are rounded, and each have a largish puncture. The mandibles are long, tolerably stout, and but slightly curved; they have each two, somewhat obtuse, teeth. The mentum is broader than long, and emarginated in front; the labial palpi are large; the basal joint is moderate, the second joint is longer than the first, and the terminal joint is very large and nearly in the form of an equilateral triangle. The maxillæ appear to be rather obtusely pointed, and have the usual series of spines on the inner side; the outer maxillary palpi have the basal joint long, rather slender and somewhat curved; the second is short, and the terminal joint is the same triangular form as that of the labial palpi, but not quite so large; the internal maxillary palpi (or galea) are slender, the terminal joint is somewhat curved and rather long. The antennæ are long, thick, and compressed; the basal joint is long and very stout; the second is moderate, but shorter than the other joints; the third joint is about equal in length to the first; the following joints are very nearly equal in

length, and do not sensibly diminish in width at the tip. The thorax is very nearly spherical, but rather longer than broad, its upper surface is remarkably convex, and presents a faint dorsal channel; there is also a longitudinal groove on each side marking the place where the lateral reflected margin is usually found; near this lateral line are two largish punctures. Between the chief portion of the prothorax and the abdomen is a slender cylindrical neck, or peduncle, which widely separates these parts, as in the *Scaritidæ;* this neck is in fact formed of a constricted portion of the prothorax, which meets and joins a similar produced part of the mesothorax; the prosternum is produced between the anterior pair of legs. The elytra are remarkably convex, of an ovate form, and enclose the sides of the abdomen; they are very deeply striated throughout; the striæ are distinctly punctured, and the interspaces are very convex. The scutellum is long, pointed, and very narrow. The legs are long and moderately stout; the anterior femora are very thick and much arched above; the anterior tibiæ are long and rather slender, deeply notched on the inner side, the notch situated rather below the middle, the spine in this notch is very small, the apical portion of these tibiæ is not dilated nor are there any distinct spines on this part. The anterior tarsi (the specimen being a male) are slightly dilated; the four basal joints are nearly equal in size, furnished with a series of minute bristles at the sides, and with a spongy substance beneath; the claw bearing joint is long and stout. The tarsi of the middle pair of legs are not dilated, they have the sides furnished with minute bristles, but no spongy substance beneath. The posterior tarsi as usual are longer and more slender than the others; like the tarsi of the other legs, they are equal in length to about two-thirds of that of the tibiæ to which they are joined. The whole insect is of a glossy black colour, with the exception of the seven apical joints of the antennæ, which are brown, and the palpi, which are somewhat pitchy and pale at the extremity.

Its principal characters may be thus expressed:—

Genus. Disphericus.

Caput elongatum; *labrum* brevissimum, anticè emarginatum; *labium* apice subemarginatum; *palpi* articulo extimo obtriangulari; *antennæ* longæ, subcrassiores.

Thorax valdè convexus, fere globosus.

Femora antica crassiora; *tibiæ* intus emarginatæ.

Disphericus Gambianus. (Plate XII. fig. 2.)

Disph. ater, nitidus; thorace globoso, dorso canaliculato; elytris ovatis, valdè convexis, profundè striatis, striis punctatis, interstitiis convexis.

Long. corp. lin. 8, lat. 3.

Habitat in Gambia Africæ tropic. Mus. Dom. Melly.

Plate XII. fig. 2. *Disphericus Gambianus*, slightly magnified.
2 *a*, front view of the head; 2 *b*, fore leg.

This insect presents such a curious combination of characters that I find it difficult to satisfy myself as to the situation in which it should be placed among the *Carabidæ*. Mr. Melly considers it allied to *Cychrus*, in which opinion I coincide to a certain degree, but it differs from the species of that genus in several important particulars; in the first place, the anterior tibiæ are deeply notched on the inner side, and this notch is far removed from the apex of the tibiæ, the tarsi are stouter and the anterior pair are rather distinctly dilated in the male. The head and mandibles, although long, are nevertheless shorter than in *Cychrus;* the mandibles more curved, stouter, the point is more obtuse as well as the internal teeth, and the inner portion does not appear to be membranous and furnished with a series of short bristles as in the species of that genus. The labrum is short, whilst in *Cychrus* it is long, and the same difference is observable in the mentum: the palpi are shorter and the terminal joint is more truly triangular. In the form of the thorax, and in many other parts of its structure, the present insect differs much from *Cychrus*. In the form of the head it is intermediate between that genus and *Eurysoma* (or *Brachygnathus*); its antennæ more nearly resemble those of the latter genus, being stout, but are proportionately longer. In the structure of the anterior tibiæ, and in the incrassated form of the anterior femora, I find characters in which the present genus approaches very near to *Apotomus*, which has the same pedunculated thorax. On the whole I think this new genus should be placed between *Apotomus* and a group of *Carabidæ*, which may include *Tefflus*, *Pamborus*, *Eurysoma*, *Panagæus*, and some other genera, closely allied to which on the one hand is *Cychrus*, and on the other *Carabus*. These insects, with their large palpi, appear to me to be all nearly allied, though by some naturalists they are separated; I believe chiefly owing to the circumstance of the anterior tibiæ being notched internally in some and not in others. We find, however, on examination, that the difference consists

rather in the situation of the notch,* with its accompanying spine, than in its presence and absence; an examination of the anterior tibiæ of *Tefflus* and *Pamborus* will show this to be the case, inasmuch as we here find in the anterior tibiæ a structure intermediate between that observed in *Carabus* and that which is most common in the geodephagous insects. In *Carabus* the groove is longitudinal, and the spine corresponding to that, situated in the emarginated portion of the tibiæ of most other carabideous insects, is terminal, or very nearly so; in *Tefflus* and *Pamborus* the groove is oblique and the spine is removed from the apex of the tibiæ, and in *Brachygnathus* we find the notch still very low down: indeed I can scarcely perceive any difference between the structure of the anterior tibiæ in the last mentioned genus and in *Tefflus*. Now, in most classifications of the *Carabidæ*, *Tefflus* and *Pamborus* are placed near to *Carabus*, these genera being considered nearly related; but if in nearly allied genera such variations in the anterior tibiæ are formed, we cannot give that weight to the character before mentioned which we otherwise should do, and should not consider ourselves justified in removing the present new genus from among the insects with which I propose to place it on account of the notch in the anterior tibiæ being situated high up. The structure of the head and palpi I regard as of higher importance. For the present insect I propose the generic name *Disphericus*, in allusion to the almost spherical form both of the thorax and abdomen; and the specific name of *Gambianus*, to denote the part of the world in which it is found.

* I do not give these observations as new, the following lines by Latreille in the Règne Animal are to the same effect:—"Nous passerons maintenant aux carabiques dont les jambes antérieures n'ont point d'échancrure au côté interne, ou qui en offrent une, mais commençant très près de l'extrémité de ces jambes, ou ne s'avançant point sur leur face antérieure et ne formant qu'un canal oblique et linéaire."

XXXIII. *Observations on* Osmoderma *and some new Species of* Cetoniadæ. *By the late* Mr. William Bainbridge, Curator to the Entomological Society.

[Read March, 1840.]

Observing in Mr. Hope's magnificent collection of Lamellicorn beetles various undescribed insects, I expressed a wish to be allowed to describe some of them; and if the present paper meets with the approbation of the Society I shall gladly attempt other groups, as I feel persuaded, from the rapid increase of the collection above named, it is impossible for one individual to attempt to describe the novelties daily accruing, and I the more readily undertake the task as I am aware that Mr. Hope is actively engaged in describing other groups, as well as employed in finishing the last *Fasciculus* of the Coleopterist's Manual, which will, I have no doubt, shortly make its appearance.

Osmoderma of Lepeletier and Serville.

The type of the genus *Osmoderma* is the *Scarabæus Eremita* of Linnæus. Messrs. Gory and Perchéron, in their Monograph of *Cetoniadæ*, have mentioned only three species.*

Osmoderma.

Section 1.—Elytris parum scabris, subrugosis sub lente minutissime punctulatis.

Sp. 1. *Osmod. Eremita* .... Linnæus .... Europe.
2. ——— *Eremicola* .. Knoch ..... North America.

* [This is hardly correct, for Messieurs Gory and Perchéron (Mon. Cet. p. 77, and pl. 8, fig. 2), in their description of *Osmoderma scaber*, have confounded two species together, considering them as sexes of one insect; describing as the female a specimen (evidently the one contained in the collection of Mr. Hope from Lee's Cabinet, labelled *Africa æquinoxiali*, which was sent over to Paris by Mr. Hope for their examination) as distinguished by "l'absence des rebords du chaperon, et par ses carenes dorsales, peu senties; sa couleur, du moins *dans l'individu que* nous avons sous les yeux, est plus foncée." Their figure 2 is evidently taken from this individual, as it agrees exactly with Mr. Hope's specimen in size and shape. The sexes of the true North American species differ however in the wider form of the clypeus and thorax, both sexes however agreeing together in colour as well as in having the front of the clypeus elevated; one sex moreover has the elytra evidently narrowed in front. Mr. Kirby appears to have described the *Osm. scabrum* under the name of *Trichius* (*Gymnodus*) *foveatus* in the Fauna Boreali Americana, p. 140, where he has described another species under the name of *Trichius* (*Gymnodus*) *rugosus*.—*J. O. W.*]

Section 2. Elytris scabrosis, striato-punctatis.

Sp. 3. *Beauvoisii*..... Hope ..... Equin. Africa.
4. *Scabrum* ..... Pal. Beauv... New York.

As there cannot exist a doubt as to the species of the first section, I do not re-describe them. The following descriptions of the two remaining, with their measurements, will sufficiently discriminate them.

Sp. 3. (1.) *Osmoderma Beauvoisii*, Hope.

Nigrum, clypeo convexo, thorace fortissime punctato seu varioloso, lateribus externe subserratis, lineâ mediâ longitudinali parum impressâ. Elytra thorace multo latiora, depressa, striata, striis fortiter insculptis. Corpus infra nigrum et nitidum.

Long. lin. 9—11, lat. lin. 6.

I have named this species after Palisot de Beauvois. The locality is equinoctial Africa, and not North America; the specimen in Mr. Hope's collection was contained in the collection of Mr. Lee.

Sp. 4. (2.) *Osmoderma scabrum*, Pal. de Beauv.

Syn. *Trichius scaber*, Pal. de Beauv. p. 58, Col. Pl. IV. fig. 2.

Cupreo-æneum seu bronzeum, clypeo valde reflexo, posticè foveato. Thorax hexagonus, crebrissime punctulatus, sulco longitudinale lato fortiter impresso. Elytra depressa thorace parum latiora, striis rugoso-punctatis. Corpus infra bronzeum punctulatum.

Long. lin. 9—10, lat. lin. 5.

The above description, as well as the locality, point out this as a distinct species; it differs in various other minute points, which it is scarcely necessary to mention, as the species is well known. It has been taken near New York, in tolerable profusion, by Mr. E. Doubleday.

Sp. 3. *Gnathocera Iris* (Fabricius, *Gn. amabilis*, Bainbridge, olim).

Forma fere ut *Gnath. nigritarse*, Hope. Totum corpus supra et infra smaragdinum, nitidum, pedibus roseo-opalino colore micantibus. Caput clypeo emarginato, antennis nigro-piceis, gula aurantiis capillis obsita. Thorax trigonus, antice truncatus, lateribus marginatis, punctis atris sparsim dispositis. Corpus infra opalino-viride, et punctatum. Pedes femoribus

tibiisque micantibus, roseoque colore tinctis et quasi vermibus erosis.

Long. lin. 10, lat. lin. 4.

Habitat in Sierra Leonâ. In Mus. Dom. Hope.

The head and clypeus are elongate, quadrate, and punctate; the margins are reflexed; the anterior angles rounded, and slightly sinuated in front. Thorax broader than long, more punctate at the sides than on the disc. The lateral margins reflexed, the reflexed margin ending before it reaches the base of the thorax. Elytra not much wider than the thorax, and punctate-striate, each elytron has two elevated and abbreviated ridges. Body beneath punctate. Legs slightly clothed with tawny pubescence, and marked with numerous vermiculate lines.

This fine species is entirely of an emerald green colour, shaded with black. [Vid. Arcan. Ent. pl. 19, fig. 2, and p. 107.]

Sp. 4. *Diplognatha nigrita*, Bainbridge.

Totum corpus supra et infra nigrum. Caput clypeo quadrato, dente breve utrinque armato, lateribus elevatis. Thorax hexagonus, variolosus. Elytra thorace parum latiora, antice scabra, postice lævíora, in singulo ad apicem tuberculum elevatum et insignitum. Corpus infra nigrum punctatum, pedibus atropiceis.

Habitat in Sierra Leonâ.

The above undescribed species was brought to this country by Mr. Strachan, lately returned to England. I cannot consider any of the insects figured in Messrs. Gory and Perchéron's Monograph to be the same species; it is to be regretted that many of the descriptions of the species in that work are very deficient, and some of the plates are so bad that it is impossible to make out the species intended by those authors. The present species is very closely allied to the *Diplognatha variolosa* of Latreille.

Sp. 5. *Diplognatha holoserica*, Bainbridge.

Totum corpus supra nigrum, thorace subtilissime punctulato, elytrisque striatis, lineis aliquot elevatis, punctis inter strias dispositis. Corpus infra nigrum, nitidum, pubescentiâ aureolâ aspersum. Abdomen lineâ mediâ longitudinale rubrâ impressâ, pedibus ciliatis.

Long. lin. $9\frac{1}{2}$, lat. lin. $5\frac{1}{2}$.

Habitat in Sierra Leonâ.

I have given the name of *holoscrica*, signifying velvety, to this species, as it expresses well the character of the insect, *holosericea* is quite another word.

The clypeus is quadrate and punctate, with the margins reflexed and slightly produced at the anterior angles. The thorax is hexagonal and very convex, the surface resembling velvet, of a black colour, and punctured. Scutellum rather large. Elytra dull black, with elevated ridges, and striated, the interstices punctate. Body beneath shining black, the breast and legs clothed with tawny hairs.

The above fine species was brought to England by Mr. Strachan.

Sp. 6. *Diplognatha rama*, Hope's MSS.

Similis *Cet. hebrææ*, Oliv., at differt. Rufescens, thorace elytris purpureo-variegatis, clypeo rotundato. Corpus infra nigrum et nitidum, sterno rotundato, et rubro. Pectus utrinque maculâ latâ rubrâ insignitum; externis segmentis abdominis femoribusque posticis rubro-maculatis, lateribus quasi vermibus erosis.

Long. lin. $8\frac{1}{2}$, lat. lin. $4\frac{1}{2}$.

Habitat in Japonia. In Mus. Dom. Hope.

For the present I range this species under *Diplognatha*, to which genus it is certainly nearly allied, although I believe no *Diplognatha* has yet ever been described from the East Indies; I think it right therefore to state the cause of my doubt, and add some other characters. The head and clypeus are quadrate and punctate, with the anterior margin rounded and reflexed, and not sinuated as in *Cet. hebræa*. The thorax is hexagonal, with the corners rounded. The surface is sparingly punctate at the sides. The elytra are broader than the thorax, and but little attenuated. The entire surface of the insect is of a testaceous red, thickly variegated with bluish black markings. The apex of the sternum is dull red. The sides of the breast, and the apex of the intermediate and posterior femora, together with the sides of the abdomen, are spotted with the same colour.

Sp. 7. *Diplognatha pectoralis*, Hope's MSS.

Corpus supra fusco-rubrum; clypeo 2-dentato, pectore infra flavo maculato, segmentis abdominis utrinque flavo-notatis, pedibusque piceis.

Long. lin. $7\frac{1}{2}$, lat. lin. 4.

Habitat in Sierra Leonâ.

This insect is closely allied to *Diplognatha;* it appears to be a form uniting *Campsiura* of Mr. Hope and *Diplognatha* of Messrs. Gory and Perchéron. The following characters distinguish it from both.

The head and clypeus are elongate and quadrate, the sides are elevated and produced into two small teeth at the anterior angles. The thorax is hexagonal, and the spaces between the angles are subsinuate, a few large variolose punctures appearing at the sides; the thorax is depressed and much produced towards the scutellum. The elytra are broader than the thorax, and much narrowed at the apex, with the surface uneven. The shoulders are elevated and impressed, deeply concave near the scutellum, and punctato-striate; the striæ are indistinct and imperfect. The colour above is pitchy red and very glossy; beneath it is somewhat of a lighter colour. The epimera are yellow, and the breast on each side has a broad yellow spot, with a smaller one near the margin of the elytra. The first four segments of the abdomen are also spotted with yellow. The hexagonal sub-sinuated form of the thorax, and the colours beneath, well characterize this species from any other yet described. It may probably be considered the type of a new genus.

Sp. 8. *Stripsipher ambiguus*, Hope's MSS.

Totum corpus supra et infra nigrum pubescentiâ aureolâ aspersum. Caput nigrum, clypeo antice porrecto seu nasuto. Thorax punctatissimus, antice rotundatus, postice subsinuatus, lateribus angulatis. Scutellum magnum, punctulatum. Elytra thorace latiora, parum convexa, lineis quatuor elevatis longis, aliâque abbreviatâ ad marginem positâ. Corpus infra nigrum, pubescentiâ flaveolâ aspersâ.

Long. lin. $6\frac{1}{2}$, lat. lin. $2\frac{1}{2}$.

Habitat in Sierra Leonâ.

This remarkable insect at some future time will be the type of a distinct genus, it is closely allied to *Stripsipher* of Gory, and for the present may be ranged with that genus. It was brought to this country by Lieutenant Sayers.

Sp. 9. *Cetonia Withillii*, Bainbridge.

Cuprea, thorace binis maculis albis minutis, fere in medio disci positis, elytrisque flavo-maculatis. Corpus infra roseo-cu-

preum nitidum, pectore et abdomine variis maculis aspersis, pedibusque cupreis.

Long. lin. 12½, lat. lin. 9.

Habitat in Indiâ Orientali.

This magnificent *Cetonia* was brought to England by Colonel Withill, and I retain the name applied to it, after that indefatigable collector, in Mr. Hope's cabinet.

The body is large and quadrate; the clypeus nearly square, anteriorly reflexed, and slightly punctate. The thorax is convex and rather broader than long, and as narrow as the head in front; it is much dilated and deeply sinuated behind, with two minute white spots near the disc and a small white spot at each posterior angle. The elytra are convex, broad at the base, slightly attenuated, and rounded at the apex; the sutural angles are produced into an acute spine, the sternum being short and rounded. The upper surface of this beautiful *Cetonia* is of a dark copper colour, with six yellow spots on each elytron, four at the margin and two near the suture. Body beneath of a rich shining copper colour, with the breast and abdominal segments spotted with yellow.

Sp. 10. *Cetonia Saundersii*, Bainbridge.

Affinis *Cet. alboguttatæ*, Vigors, at differt. Totum corpus supra aurato-viride, alboguttatum; antennis tarsisque nigricantibus. Corpus infra viride, nitidum, segmentis abdominis utrinque albomaculatis.

Long. lin. 8, lat. lin. 4.

Habitat in India Orientali, forsitan e regione Assamensi.

This insect was given to Mr. Hope by W. W. Saunders, Esq., who has named it after him. The following differences distinguish it from the *alboguttata* of Vigors.

Head and clypeus punctate, with the anterior angles rounded and the margin reflexed. Thorax as long as broad, trigonate and punctate. Elytra broader than the thorax, striate-punctate. Colour shining green, the thorax with eight small round white spots. Epimera green, with a white spot. Elytra golden and brilliant green, with seven white spots on each. Body beneath shining green, very much punctate, with a few white spots. In various other respects this insect differs considerably from the *alboguttata* of Mr. Vigors, that species being a dull green colour and impunctate, with white spots on the head and clypeus; *Cetonia Saundersii* is of a shining green and very much punctured,

the white spots are fewer in number and differently located, and the elytra do not terminate in a spine.

Sp. 11. *Amphistoros affinis*, Bainbridge.

Affinis *Cet. elatæ*, Fab., at differt. Nigra, thorace lineis tribus albis. Elytris flavis, ad apicem albo-punctatis, anoque utrinque maculâ albâ rotundatâ insignito. Corpus infra nigro-piceum, medio abdominis concolori, lateribus albo-maculatis.
Long. lin. 7, lat. lin. 4.
Habitat in Sierra Leonâ.

It is with a doubt I describe this as a new species; I shall therefore state at length the difference between what I have named *affinis*, and the *Cetonia elata* of Fabricius, and the *varians* of Messrs. Gory and Perchéron. In markings and in colour it cannot agree with the former, and with regard to *varians* it is shorter and broader than that species, and differs very considerably in its sculpture and markings; its leading peculiarity is, that the centre of the abdomen is pitchy black, without the usual row of spots. I mention this as I believe it to be a sexual difference, the same variation occurring in the species named *elata* by Fabricius. It appears, therefore, that this species must be compared with *varians* of Gory and not with *elata;* it differs from the former, in the markings of the thorax, in the absence of the two round spots at the apex of the elytra; the podex is also differently marked, having a small round white spot on each side, whereas in *varians* it is almost entirely white. There is probably another species allied to *affinis*, which I do not attempt to describe till I ascertain the opinion of those who are competent to judge on the matter. I believe no entomologist has yet mentioned any thing concerning the sexes of this genus.

Stethodesma,* Hope.

Forma *Gymnetidis*. Clypeo fisso sicut in *Lomaptera*. Thorax trigonus, antice abrupte truncatus, postice disco protenso ut in *Gymnetide*. Elytra gradatim basi ad apicem attenuata, medio acuminata. Sternum valde prominens, oblique fissum, apice antice elongato. Pedes anteriores femoribus bispinosis, reliquis inarmatis.

* So named from στηθοδεσμος, a bandage of the breast.

Stethodesma Strachani, Hope.

Totum corpus fere nigrum, marginibus externis rubris. Elytris atris, postice albis punctis insignitis, apicibusque rubris. Corpus infra rubro-piceum, segmentis abdominis duplice serie macularum notatis.

Long. lin. 12½, lat. lin. 6.

The above remarkable insect is named in honour of P. S. Strachan, Esq., one of the most indefatigable entomologists that ever visited Sierra Leone. As I have formed it into a genus I may, perhaps, be allowed to dilate more fully in English details than I have in the Latin.

Clypeus elongate, smooth, and deeply emarginate in front. Thorax very convex, lateral margins rufous. Scutellum not visible, the base of the thorax being produced into a projecting lobe, as in *Gymnetis*. Elytra rather broader than the thorax, with indistinct elevated ridges, and five small yellowish white spots near the apex, which is rufous. Body beneath pitchy red. Sternum large, projecting. The abdomen is marked with yellowish white spots; the upper surface of this fine insect of rich black velvet. In size and form it resembles *Lomaptera*, while in its large epimera it approaches *Cetonia*, and, as above noticed, the basal lobe of the thorax connects it with *Gymnetis;* its superficies being like the South American species named *Marmorina* by Mr. Kirby.

XXXIV. *Description of* Scolia fulva. *By* W. E. Shuckard, Esq.

[Read March, 1840.]

Scolia fulva. (Griffith's Animal Kingdom, vol. xv. page 516, plate 71, fig. 1.)

This insect was described in the following words in the work above quoted:—"Of *Scolia* we have figured a species which we call *fulva*. It is black, but entirely clothed with fulvous hairs; the basal segment of the abdomen and posterior femora black, the former shining. It is from South America."

There are some particulars in this description omitted and others erroneously stated, and all the deficiencies I am enabled to supply through the kindness of the Rev. F. W. Hope, our president, who has placed both the sexes in my hands for the purpose of describing them. The species belongs to the first section of *Scolia*, with three submarginal cells and two recurrent nervures. It is very rare in *coloured Scoliæ* that the sexes are alike, but here we have a complete resemblance, except in structural details peculiar in the sexes. The following is their description:—

Head, thorax, base of abdomen and thighs black, the head and thorax covered with a dense fulvous pubescence, remainder of abdomen, antennæ, tibiæ, and tarsi of a rich fulvous red. The wings are fulvous, with their margin obscure.

In the female the abdomen has a black spot on each side of the second, two spots in the centre of the third, and an abbreviated interrupted transverse black band on the fourth, segment, and the male has the margin of the second segment black.

These insects, instead of being from South America, are from New Holland and its vicinity; the female is from Melville's Island, and the male from some part of New Holland which is unnamed. I am able thus to show foreign Entomologists what the insect is that has thus previously been incorrectly described, although well figured, especially in the coloured copies of the above work.

XXXV. *Descriptions of some new Species of Exotic Hymenopterous Insects.* By J. O. Westwood, Esq., F. L. S., &c.

[Read December, 1840.]

Section. ACULEATA.

Familia. SPHEGIDÆ.

Trirogma, *Westw.*

Genus *Hymenopterorum* novum et eximium, characteribus insolitis distinctum et ad sectionem *Aculeata Fossoria* pertinens.

Corpus subelongatum, punctatum, cælureo-coloratum, et pilis longis piceis undique villosum; thorace antice attenuato, abdomine thorace haud longiori.

Caput mesothorace paullo angustius, supra subdepressum; clypeo brevi, subdeclivi, supra tuberculo armato, in quo insident antennæ. *Oculi* magni, angulos laterales et anticos capitis occupantes. *Ocelli* 3 in triangulum dispositi et inter oculos positi.

Antennæ ♂ fere corporis longitudine, graciles, filiformes, 13-articulatæ, articulis apicalibus multo brevioribus, tenuoribus et paullo curvatis. *Clypeus* transversus. *Labrum* minutissimum, setosum, exsertum, obovatum, depressum, membranaceum. *Mandibulæ* validæ curvatæ, apice acutæ, intus dente latissimo (cujus angulus basalis valde prominens est et acutus), externe villosæ. *Maxillæ* parvæ lobo apicali in medio plagâ coriaceâ mediâ instructæ. *Palpi maxillares* 6-articulati, articulo 1mo minuto, 2bus proximis majoribus, ultimis tribus elongatis et gracilioribus. *Mentum* compressum, medio longitudinali corneo. *Labium* retractum, lobis duobus lateralibus membranaceis instructum. *Palpi labiales* 4-articulati; articulo basali longiori, 2do breviori.

Thorax oblongo-ovatus, antice attenuatus. *Collare* mesothorace multo angustius, antice angustum, lateribus rotundatis, supra impressione longitudinali in lobos duos supra angulatos divisum. *Mesothorax* latus, tegulis magnitudine mediocri. *Scutellum* breve. *Metathorax* subconicus, lateribus ex medio in tuberculum angulatum productis.

Alæ anticæ stigmate mediocri; cellula unica marginali; tribus completis alteraque inchoata submarginalibus, harum cellula 1ma elongata accipit, versus apicem, venam primam recurrentem; cellula 2da minori antice angustata accipit, pone medium, venam secundam recurrentem, 3tia majori subquadrata.

Pedes graciles simplices, femoribus ad basin clavatis, tarsis longis gracilibus, unguibus bifidis terminatis.

Abdomen subovale e segmentis tribus supra et infra formatum, petiolo breve, segmento primo convexo, lateribus rotundatis et postice coarctato, 2do subquadrato, subconvexo, lateribus rotundatis, 3tio subconico, apice rotundato.

I greatly regret that I have only had an opportunity of examining the male sex of this insect, for the reception of which I have proposed the present genus, especially as it is not to be doubted that the female would exhibit as many remarkable features as the male above described, which indeed offers a combination of characters which we nowhere else meet with amongst the fossorial *Hymenoptera*. The great length of the antennæ, the insertion of the same organs upon a frontal tubercle, the very minute size of the labrum, the angular projections at the sides of the metathorax, the bifid ungues, and especially the existence of only three segments in the abdomen, may all be mentioned as proofs of the anomalous character of the genus.

In respect to the natural situation of the genus it appears to me that it ought to be placed in the family *Sphegidæ*, in the neighbourhood of *Dolichurus*, which has also the antennæ inserted upon a frontal tubercle. It is, however, separated from that genus by many characters. In other respects, especially in the form of the head, collar, bifid ungues, and the construction of the male abdomen, which in *Chlorion* ♂ has the terminal segments almost obsolete, it also nearly approaches *Chlorion*, from which however it is widely distinguished as a genus. In the minute size of the labrum it resembles *Sapyga*, with which, as well as with *Tiphia* and some other Mutillideous and Scoliideous genera, it also agrees in the bifid ungues. In *Tiphia* also the first and second submarginal cells respectively receive a recurrent vein, but this character exists in several other genera belonging to different families; from all these, however, *Trirogma* is distinguished by the arrangement of the other cells of the wings. I know no other fossorial Hymenopterous insect which has only

three segments in the abdomen, and I have therefore selected that character as the best suited for affording a generic name.

Trirogma cærulea, Westw.

Tota cærulea, punctata, griseo-villosa; antennis, tibiis tarsisque nigris, alis hyalinis, stigmate venisque nigris, metathorace utrinque supra lineâ elevatâ obliquâ areâque mediâ basali notato.

Long. corp. lin. $6\frac{1}{2}$; expans. alar. lin. $9\frac{1}{2}$.

Habitat in partibus septentrionalibus Indiæ orientalis.

In Mus. Dom. W. W. Saunders.

I beg to express my best thanks to W. W. Saunders, Esq., for an opportunity of examining this and other novelties in a splendid collection of insects which he has lately received from Northern India, collected by Lieut. Campbell; a collection exceedingly interesting in a Entomo-geographical point of view, combining the peculiarities of the Himalayan and more tropical Indian forms, and comprising an unusual number of novelties, not only of species but also of genera, in all the orders of insects, and which, as a whole, may be considered as one of the most characteristic collections which has yet been brought to England from the East Indies.

Plate XII. fig. 3. *Trirogma cærulea* ♂ magnified.
3 *a*, front of clypeus and base of antennæ; 3 *b*, mandibles and labrum; 3 *c*, maxilla; 3 *d*, labium; 3 *e*, ungues.

APHELOTOMA, *Westw.*

Genus novum ex ordine *Hymenopterorum* et familia *Sphegidarum Chlorioni* affine.

Caput latum facie depressa, antice haud tuberculata, parum producta et paullo ante oculos recte truncata. *Labrum* horizontale, mediocre oblongo-subquadratum, angulis anticis rotundatis, margine antico longe ciliato. *Mandibulæ* ♀ crassæ, versus basin subito constrictæ, apice acutæ, dente interno parvo acuto armatæ. *Maxillæ* basi corneæ, lobo apicali mediocri supra rotundato. *Palpi maxillares* 6-articulati, articulis duobus basalibus brevibus, fere æqualibus; 3tio longiori et paullo crassiori; 4to longiori, graciliori, duobus ultimis æqualibus, gracilibus. *Mentum* corneum compressum. *Labium* membranaceum productum integrum, lobis duobus

lateralibus munitum. *Palpi* labiales 4-articulati; articulo 1mo longo, 2do breviori crassiori, duobus ultimis gracilioribus subæqualibus. *Antennæ* breviores, subfiliformes, articulo 1mo longo, 3tio longissimo.

Collare conicum dorso in medio plano, angulis posticis rotundatis. *Metathorax* obconicus postice subtruncatus, angulis posticis haud productis. *Abdomen* segmentis quatuor basalibus subæqualibus; 1mo et 2do nitidis, lævibus, reliquis obscurioribus. *Alæ* breves, anticæ vix thorace longiores; cellula unica marginali apice haud appendiculata; cellulisque quatuor submarginalibus; 1ma majori, (in medio ad apicem appendiculata,) venam primam recurrentem excipiente; 2da parva, antice attenuata; 3tia subquadrata et venam secundam recurrentem versus basim excipiente; 4ta ad apicem alæ currente. *Pedes* ♀ elongati, omnino inermes et ciliis destituti. *Tarsorum* articulo penultimo simplici. *Ungues* in medio subtus dente parvo instructi.

It is difficult to speculate on the habits of this interesting insect. The entire absence of ciliæ in the legs might lead to the idea that it was a parasite; but we now well know that this character offers no criterion as to the working or parasitic habits of the fossorial *Hymenoptera*. In the aberrant species of *Sphex*, *S. lobata*, *&c.* we find very strongly ciliated feet, and in the still more closely allied types of the genus *Chlorion* (*C. compressum*, *&c.*), the legs, although not strongly ciliated, are compensated by the dilatation of the penultimate tarsal joint, and by the produced angles of the preceding joints. The type of *Chlorion* is well ascertained to attack the cock-roaches, which it buries, as the support of its progeny. The slightly produced clypeus and the short strong dentate mandibles of *Aphelotoma*, are other characters which prove a distinct economy from that of the true species of *Chlorion*.

The only species of *Aphelotoma* which I have hitherto seen is a native of Van Diemen's Land, and has been communicated to me by Mr. Ewing.

Aphelotoma tasmanica, Westw.

Nigra, pedibus rufis; alis fuscis, anticis fasciâ mediâ albâ.

Long. corp. lin. 4¾, expans. alar. lin. 6.

Habitat in Terra Van Diemenii.

In Mus. nostr. Communicavit Dom. Ewing.

Caput nigrum, opacum, sub lente striolis lævissimis notatum, impressione semicirculari ante antennas clypeum simulante; antennæ nigræ, articuli 4ti apice, 5to toto, 6to fere toto rufescentibus. Thorax niger. Collare nigrum compressum, dorso tamen planiusculo lineâ tenui mediâ longitudinali impressâ. Metathorax supra planiusculus, carinis duabus elevatis utrinque, dorso lineis circiter 10 irregularibus longitudinalibus elevatis, striis transversis connexis. Abdomen nigrum elongato-ovale, segmento 1mo ad apicem parum constricto nitido; 2do paullo majori nitido; 3tio fere æquali subopaco; 4to minori; 5to minuto; 6to attenuato acuto rufescenti. Pedes rufo-fulvi, tarsorum apicibus paullo obscurioribus. Alæ anticæ fuscæ, fasciâ hyalinâ transversâ ante stigma notatæ; posticæ hyalinæ.

Plate XII. fig. 4. *Aphelotoma tasmanica*, magnified.
4 *a*, front of head with the labrum removed; 4 *b*, labrum; 4 *c*, mandible; 4 *d*, maxilla; 4 *e*, labium; 4 *g*, ungues.

Chlorion, Latr.

The genus *Chlorion* was established by Latreille in the third volume of the "Histoire Générale, &c. des Insectes;" wherein it formed the first genus of the second section of the *Sphegimæ*, characterized by the straight maxillæ and tongue (not bent as in the first section of typical *Spheges* and *Ammophilæ*), the maxillary palpi much longer than the labial, with irregular shaped joints (instead of being regularly shaped, and nearly of equal length with the labial palpi, as in the first section). The only species given as the type of the genus in this volume is the *Sphex lobata* of Fabricius; but as the characters of that species do not accord either with the sectional or generic characters of *Chlorion*, it is necessary to determine what insect Latreille had in view in the establishment of the genus. We accordingly find in the thirteenth volume of the same work, published in 1805, that another species is added as a second type, namely, *Sphex compressa* of Fabricius—an insect generically distinct from the former, and which agrees with Latreille's characters of *Chlorion*. The short maxillæ and palpi, the pointed tip of the labial palpi, the short tongue, the truncation of the extremity of the thorax, the constricted form of the extremity of the basal segment of the abdomen, the small size of the posterior calcariæ, the posterior tibiæ and tarsi almost destitute of ciliæ or bristles, are all characters of *Sphex compressa*

and not of *Sphex lobata*. It is true, however, that Latreille has added a character which does not agree with the female of *S. compressa* although it accords with that sex of *S. lobata*, namely, the mandibles furnished with a "dent remarquable." This character is however found in the male of *S. compressa*, although not in the female, at least the mandibles of the male of that species have a strong *acute* tooth on the inside, of which the females are destitute, whilst the females of *S. lobata* have a *truncated* tooth in the same situation; so that it seems to me not improbable that Latreille had taken this character from *S. lobata* and had added it to the rest taken from *S. compressa*. We find the character of unidentate mandibles given in the thirteenth volume of the "Histoire," &c.; and in the "Genera Crustaceorum," &c. vol. iv. p. 56, *Chlorion* is formed with *Pronæus* into a section of the *Sphegimæ*, having the mandibles internally furnished with a strong tooth or process; the two species above mentioned being still given as the types of *Chlorion*. In all his subsequent works the genus is treated in a similar manner, except that in the second edition of the "Règne Animal" *Sphex compressa* is given as the first, and *S. lobata* as the second, species, and the genus is characterized from the position of the recurrent veins of the wings of *S. compressa* (those of *S. lobata* differing in this respect).

We are thus warranted in considering the *Sphex compressa* as the true type of the genus *Chlorion*, although Latreille at the first gave only the *S. lobata* as its type. It unfortunately happened, however, that during the interval which elapsed between the publication of the third and thirteenth volumes of the "Histoire générale," Fabricius published his "Systema Piezatorum," wherein, referring to Latreille's third volume, he adopted the name *Chlorion*, giving, as Latreille had done, the *Sphex lobata* as its type, with the oral characters of the genus derived from that species; but also inserting in the genus the *Sphex compressa*, and another species congenerous with that insect (*S. sibirica*), as well as various species of *Sphex* and *Pronæus*. Shortly afterwards Jurine published his System of the *Hymenoptera* founded on the variation of the veining of the wings, and accordingly, following Fabricius in considering the *Sphex lobata* as the type of *Chlorion*, he sunk the genus into *Sphex*, with which that species agrees in the veining of the wings; but finding that the *Sphex compressa* possesses a different character in this respect, he formed for its reception a new genus named *Ampulex*, adding a second species, *A. fasciata*, from the south of Europe, of which (as possessing more interest) he

gave a figure in illustration of the genus. As subsequently mentioned, however, this species differs in several slight respects from *C. compressa*, especially in the incomplete veining of the wings forming the submarginal cells. The specimen of *A. fasciata*, figured by Jurine, is a female, and the mandible represented by its side is that of a female being destitute of an internal tooth. Jurine, however, in his generic character, noticed the sexual distinction occurring in the armature of the mandibles.

In the "Genera Crustaceorum," which appeared soon after Jurine's work, Latreille gave *Ampulex* as a synonyme of his *Chlorion;* but in his later works ("Familles Naturelles" and "Règne Animal," second edition) he gives the two genera as distinct, placing them in different sections of the family *Sphegidæ*, having the mandibles internally simple or dentate, thus overlooking Jurine's correct notice of this difference being only sexual. It is thus evident that Latreille regarded the *Ampulex fasciata* as the type of the genus *Ampulex*, and as generically distinct from his own genus *Chlorion*, with which he states that *Ampulex* agrees in the veins of the wings, thus further proving that *Sphex compressa* was his real type of the genus *Chlorion*.

It remains to be noticed that Panzer, in his "Entomologischer Versuch die Jurineschen Gattungen," has pointed out the differences which exist between *Sphex lobata* and *compressa* in their cibarian characters, and that Messrs. Serville and Saint Fargeau, in the "Encyclopédie Méthodique," have given a long generic character of *Ampulex* with *Sphex compressa* as its type, (erroneously, however, stating that the mandibles are internally destitute of teeth in both sexes,) and adding that they consider it doubtful whether Jurine's *Ampulex fasciata* belongs to this genus. They have also adopted as distinct the genus *Chlorion*, dividing it into two sections, the first corresponding with the genus *Pronæus* of Latreille, and the second given as the "*genre Chlorion, Latr.*" including *Chlorion lobatum* and two new species. Lastly, M. Guérin has lately figured a new species congenerous with *Sphex compressa* as an example of the genus *Ampulex*.

From what has been stated above I consider, 1st, that the genus *Chlorion* was always characterized by its founder from *Sphex compressa*, which must be regarded as its real type; 2nd, that Fabricius adopted an error of Latreille in giving *Sphex lobata* as the type, and described a genus under the name of *Chlorion* distinct from that of Latreille, and consequently that a new generic name must be given to *Sphex lobata* if indeed it be generally dis-

tinct from Latreille's *Pronœus;* 3rd, that Jurine's genus *Ampulex* is synonymous with Latreille's genus *Chlorion*.

I am sorry that these conclusions will have the effect of sinking the genus *Ampulex*, which Jurine must certainly have the credit of having first clearly distinguished, and will be at variance with the nomenclature of recent French Hymenopterologists.*

There are several fine species of *Chlorion* in the cabinet of the British Museum which I have not yet had an opportunity of describing. I, however, take this occasion of describing a congenerous insect in my own cabinet, which is by far the most minute species I have yet seen of the genus, in addition to the description of the two allied genera above characterized.

Chlorion cyanipes, Westw.

Parva nigro-cærulea, rude punctata, mesothoracis dorso in medio haud longitudinaliter impresso; pedibus cyaneis ♂.

Long. corp. lin. $3\frac{1}{2}$, expans. alar. lin. $5\frac{1}{2}$.

Habitat apud promontorium Bonæ Spei.

In Mus. nostr.

* Since the preceding was written, the volume upon Insects in the Cabinet Cyclopedia has been published, in which Mr. Shuckard expresses his surprise that the *Ampulicidæ* should so long have been allowed to remain incorporated with the *Sphegidæ*, as they present so many distinctive characters, instancing the formation of the abdomen, the remarkably sculptured metathorax (which is stated to be armed at its extremity with a couple of spines), the nose-like clypeus, and the formation of the penultimate joint of the tarsi. It is added that one genus of them is found in all quarters of the world, and a genus from New Holland is mentioned (by name only) *Conocercus*, which, like *Dolichurus*, is of a black colour. "*Chlorion*, distinguished for its metallic colours," is given as a genus belonging to the next family, *Sphegidæ*.

I need not recapitulate the arguments I have already brought forward in the beginning of this paper to prove that the insects above alluded to, as forming the types of a distinct family, are entitled to the name of *Chlorion* and not to that of *Ampulex*. Neither shall I make any further remark upon the proposed establishment of a distinct family for these insects, than that the characters insisted on by Mr. Shuckard occur only in the typical genus: *Dolichurus*, *Trirogma*, and *Aphelotoma*, the only other genera belonging to the group hitherto described scarcely possessing more than one of the assigned characters, whilst that which is considered the "most remarkable," namely, the form of the tarsi, occurs in none but the type. Of their geographical range none have hitherto been described as inhabitants of the New World. Of the New Holland genus, indicated by name only, I presume from its name and locality that it is identical with my genus *Aphelotoma*. As, however, it had stood in my cabinet as a new genus for several years before it existed in any other collection, I trust that my name and the very detailed description and figure given of the insect at the last meeting of the Society, before even the name *Conocercus* had appeared, will be received with the courtesy which is given to memoirs read before scientific bodies.

Nigro-cærulea, rude et vage punctata. Mesothorax dorso antice haud lineâ mediâ longitudinali impressus, parapteris lateralibus tamen distinctis. Metathorax ut in *C. compressa* striatus, angulo apicali utrinque in tuberculum parvum acutum producto. Abdomen concolor, rude punctatus, apice griseo-villosum. Pedes cyanei, femoribus magis cæruleis; tarsis nigris, articulo 4to lobato, minori tamen quam in speciebus reliquis. Alæ fuscescenti-hyalinæ, nubila subapicali obscuriori in cellula marginali, 2a et 3a subapicalibus et ad angulum analem extensa.

Another species received from the banks of the river Gambia by the Rev. F. W. Hope in great numbers, appears to have been figured by Guérin under the name of *Ampulex compressiventris*, in the Iconographie du Règne Animal.

The typical species, *Am. compressum*, is, I believe, identical with the *Sphex rufilumbis* of Lichtenstein.

The European species figured by Jurine ought evidently to constitute a distinct subgenus; the armature of the head, the different arrangement of the veins of the wings as figured in outline by Jurine, and the elongated and apparently simple feet, are characters distinct from those of the true species of *Chlorion* proper.

XXXVI. *Description of a new Genus of Apterous Hexapod Insects found near London.* *By* J. O. Westwood, Esq., F.L.S.

[Read February 7, 1842.]

At the November meeting of this Society in 1840, I exhibited drawings of a minute wingless insect, which, as it would not accord with the larvæ of any known group of insects, I was induced at the time to think might possibly constitute a new genus of myriapodous insects in an undeveloped state. I had found this insect, which is scarcely a quarter of an inch long, running very quickly amongst the roots of flowers at a little distance below the surface of the ground, in which situation I had also detected immature *Lithobii*, *Juli*, and other *Myriapoda*; and, moreover, finding in this insect a number of minute appendages arranged in pairs on the under surface of the abdominal segments, I at once

compared it with the immature *Lithobii*, whose developement I was then investigating, and which, in the very early states of their existence, also presented traces of subabdominal appendages similar to those of my new insect, which appendages are subsequently developed into abdominal legs.

Want of opportunity to examine the entire insect, not having since found another individual, joined with other investigations, induced me to lay aside my drawings and notes until a future opportunity occurred of reinvestigating the insect in nature. The elaborate memoir, however, which Mr. Newport has recently published in the Philosophical Transactions, on the development of the *Myriapoda*, (and which the Royal Society have done honour both to themselves and to its author by selecting as the Bakerian Lecture,) has recalled my attention to the subject, and has convinced me that the insect in question cannot be a myriapodous larvæ, because there are no fewer than seven of these minute subabdominal appendages; and further, because these minute appendages are succeeded by a pair of elongated anal filaments nearly half the length of the body, whereas in the *Myriapoda* the number of slightly developed feet at any one period is much smaller, and because the anal appendages do not appear until the feet are fully developed. Another reason which induces me to reject the idea of this insect being myriapodous consists in the structure of the mandibles, which, as noticed in the Journal of Proceedings of the meeting in question (p. 14), are short, broad, and 4-dentate at the extremity, which is oblique.

Rejecting, therefore, the idea of its myriapodous nature, we have therefore now to determine to which class and order of annulose animals the insect belongs. To do this it will be proper to detail its structural characters.

Corpus elongatum parallelum, depressum, molliusculum, apterum, 13-annulatum. Caput obovatum, distinctum, horizontale. Antennæ duæ capite duplo longiores, ad partem anticam capitis insertæ, multi-(ultra 15-)articulatæ, submoniliformes, articulo basali majori obconico, setosæ. Os inferum mandibulis minutis planis latis, apice 4-dentatis. Partes reliquæ oris deteritæ. Thorax e segmentis tribus proximis constans; segmento 1mo brevi, 2ndo, 3tioque multo longioribus et latioribus, singulo pari pedum instructo, pedibus (fere dimidii corporis longitudine) e coxa, trochantere, femore, tibia et tarso articulato formatis. Abdomen 9-annulatum, segmentis fere æqualibus et transversis, segmento basali subtus ad apicem utrinque appendiculo brevi lato, ovali plano exarticu-

lato instructo, segmentis sex proximis subtus ad apicem utrinque seta brevi tenui pilosa instructis, segmentoque anali setis duabus valdè elongatis setosis munito.

Were it not for the multiarticulate antennæ and the subabdominal appendages this insect would be to all intents the larva of a *Staphylinus*, and hence I propose for it the name of *Campodea Staphylinus*, founded on this striking resemblance.

Its colour is of a creamy white, and it is exceedingly active in its motions, running with great agility.

Several of the characters which I have described above will be sufficient to separate this insect from the larvæ of all Coleopterous, Lepidopterous, Dipterous, Hymenopterous, Strepsipterous, Orthopterous, and Hemipterous insects. There is indeed considerable resemblance between it and the larvæ of the *Forficulidæ*, but these are not only well known but also disagree with the present in the structure of the anal appendages and in the want of the subabdominal ones. There only remains therefore to compare it with the larvæ of *Neuroptera*, some of which have multiarticulate antennæ and anal as well as subabdominal appendages, but wherever this is the case these appendages are instruments of respiration serving to separate the oxygen from the water in which such larvæ reside: such is the case with the Ephemerideous, Phryganideous, and Sialideous larvæ. The larva of *Ascalaphus*, it is true, is furnished with lateral abdominal filaments; but these are only prolonged processes of the common integument of the body. I am compelled therefore to reject the idea that the insect is the larva of any hexapod metamorphotic insect, and am thence compelled to refer it to the classes of *Annulosa*, which do not undergo transformations. The *Crustacea* and *Arachnida*, from the number of their feet and the general structure of their bodies, are at once distinguished from this insect; and the *Myriapoda* have already been rejected, so that there only remains the orders *Anoplura* and *Thysanura* into which it can possibly enter. These are hexapod groups, the former being distinguished by the non-possession of elongated anal setæ and by the structure of the legs, which are short and strong and well adapted to a parasitic life. Some of the *Thysanura*, on the other hand, are furnished with elongated anal seta, long multiarticulate antennæ, and long cursorial feet. And M. Guérin has recently discovered in *Machylis polypoda* a series of small subabdominal appendages similar to those in my insect, and which he has illustrated in his Iconographie du Règne Animal. The *Podurœ* and allied genera, on the other hand, are cylindrical, with an inflexed fork at the end of the body, whilst

in the genera allied to *Lepisma* the body terminates in slender elongated filaments. In these however the number is more than two, and the form of the mandibles is also distinct; but from a review of the general characters of *Campodea* I think it certain that notwithstanding these minor differences it must be considered as a new genus, more nearly allied to *Lepisma* and *Machilis* than it is to any other group of annulose animals.

P.S. On showing my drawings of this insect to M. Gervais he immediately recognized it as one which he had found in the garden of his residence in Paris, further stating that he had discovered a second species of the same group.

Can this insect be *Lithobius pusillus** of Van Heyden (Mus. Seck. Bd. 2, 1837, p. 305)?

DESCRIPTION OF THE FIGURES.

Plate VIII. fig. 14, upper, and fig. 15, under, side of the insect magnified; fig. 16, under side of the head; fig. 17, apex of antenna; fig. 18, labrum; fig. 19, mandible; fig. 20, an undetermined part of the mouth; fig. 21, 22, maxillæ; fig. 23, portion of base of abdomen beneath; fig. 24, 25, apex of legs.

XXXVII. *On two Species of* Cremastocheilus *from Northern India.* *By* W. W. Saunders, Esq., F.L.S., President of the Entomological Society, &c.

[Read 1st November, 1841.]

Sp. 1. *Cremastocheilus Campbellii.* (Plate XIII. fig. 1.)

Length $\frac{6}{10}$ inch. From the north of India.

In my own collection.

Head large, depressed, elongate-quadrate, slightly emarginate in front, rounded on the anterior angles, and excavated on the sides to receive the eyes and antennæ. Antennæ situated close to and just in advance of the eyes; ten-jointed, the first joint large, elongate, triangular, the six following small, transverse, and the three terminal ones forming an ovate club when closed. Thorax orbicular, truncate posteriorly, with a slightly depressed longitudinal line down the centre, the upper surface closely and deeply punc-

* "Weiss, kurz, behaart, am letzten segment zwei horizontale hornchen. Lang $2\frac{1}{2}$ bis 3 lin. Frankf. in feuchten erde."

tured; metasternum prolonged into a robust straight spine, covered with long bristly hairs, pointing downwards just before the anterior pair of legs. Scutellum large, elongate, triangular, punctured. Elytra rather broader than the thorax, elongate, the upper surface deeply punctured, rounded at the apex, and deeply excavated laterally behind the shoulders. Legs long, somewhat slender; the anterior tibia with two strong teeth on the apex exteriorly. Tarsi five-jointed, the first joint nearly concealed, the terminal joint the most slender; the joints grooved on the upper surface. Claws short, nearly straight.

This species is entirely of a jet, somewhat glossy, black, the antennæ and trophi inclining to piceous.

Sp. 2. *Cremastocheilus brunneus.* (Plate XIII. fig. 2.)

Length $\frac{5}{10}$ inch. From Upper India.

In my own collection.

Head depressed, subquadrate, narrowed in front, rounded on the anterior angles, excavated for the insertion of the eyes and antennæ; black, with the upper surface rugosely punctured. Thorax orbicular, with a depressed longitudinal line down the centre, thickly and deeply punctured on the upper surface, very dark pitchy brown, shining; mesosternum terminating in a strong, somewhat curved, hairy spine, pointing downwards, just before the anterior pair of legs. Scutellum large, elongate, trigonate, pitchy brown, slightly rugose. Elytra a little broader than the thorax, elongate; the apex angular, deeply excavated laterally behind the shoulders, slightly punctured, shining, of a rich dark brown, darker on the shoulder. Wings ample. Body underneath dark brown, shining, the region of the metasternum deeply punctured and covered with long silky hairs. Legs long, slender, pitchy brown, the anterior tibia with two strong teeth on the apex externally. Tarsi five-jointed, the first joint nearly concealed, terminal joint the most slender. Claws short, nearly straight.

The two species I have just described were collected by Lieut. G. Campbell, of the Bengal Artillery, in the north of India, but exactly in what part I am unable to say. They are nearly allied species, but abundantly distinct; the latter, besides differing in colour, has a rounder thorax, the apex of the elytra not rounded, and the mesosternum covered with a silky pubescence. The genus *Cremastocheilus*, as it now stands, contains species very different in structure and must be divided, in which case the two species now described will form a good sub-genus, which may be distinguished by the orbicular thorax, the produced metasternum,

and the somewhat long and slender legs. This is merely thrown out as a hint to any Entomologist who will revise the various species of *Cremastocheilus* and distribute them into natural subgenera.

[P.S. Mr. Saunders having placed in my hands the two insects above described, with a view to the examination of their trophi and the investigation of their generic characters, with reference to the Monograph of Dr. Burmeister recently published upon the *Cremastocheili* in Dr. Germar's "Zeitschrift für die Entomologie," the following remarks have been rendered necessary:—In their narrow mentum, exposing the base of the maxillæ, the elongated body, rounded sides of the prothorax (which is narrowed before and behind), in the channelled mentum, in the galea and mando of maxillæ being bidentate, in all the tarsi being bidentate and longer than the tibiæ, these two species come into Burmeister's new genus *Cænochilus*† (Germar's Zeitschr. vol. iii. p. 250, 268); but all the species of that genus are from South Africa. From *Genuchus* they differ in having the bidentate galea and mando, the mentum not tubercled, and the tibiæ not 3-dentate; and from *Centrognathus* (Guérin, an Indian genus formed of a single species) in the mentum not tubercled, and the galea not 1-dentate; from the other *Cremastocheilides* they differ in having the mentum narrowed at the base. See also Burmeister, Handb. d. Ent., vol. iii. p. 667.—*J. O. W.*]

DESCRIPTION OF THE FIGURES.

Plate XIII. fig. 1. *C. Campbellii.*

1 *a*, mandible; 1 *b*, maxilla; 1 *c*, apex of antenna; 1 *d*, under side of front of head, * base of antenna beneath; 1 *e*, fore foot; 1 *f*, hind foot.

fig. 2. *C. brunneus.*

2 *a*, apex of maxilla.

† *C. Paulus, G. & P.; Maurus, F.; Sulcatus, B.* (*Maurus G. & P.*); *Ventricosus, Sch.* (*Bron G. & P.*); *Senegalensis, G. & P.; Lugubris, F.*

XXXVIII. *On* Evania *and some allied Genera of Hymenopterous Insects. By* J. O. Westwood, F.L.S. &c.

[Read November 7, 1836, and February 1, 1841.*]

The family *Evaniadæ* of Leach, or the *Evaniales* of Latreille, comprises a group of parasitic insects of but small extent, but which exhibits several very remarkable variations of structure.

The typical genus *Evania* was established by Fabricius in the "Systema Entomologiæ" in 1775, having the *Sphex appendigaster* of Linnæus as the type, but comprising, as a second species, an insect of this country belonging to the genus *Ceropales*, observed by Fabricius in the collection of Sir J. Banks. Subsequently Latreille instituted another genus, which, in his early works, he named *Gasteruption*, but Fabricius having in his "Systema Piezatorum" established the same genus under the more pleasing name of *Fœnus*, Latreille subsequently adopted the latter name. The last mentioned author also at the same time proposed another genus, *Pelecinus*, founded upon a remarkable insect inhabiting North America. Jurine added a fourth genus, *Aulacus*, established upon an European species, and Latreille, in the "Familles Naturelles" and "Règne Animal," second edit., introduced a fifth genus, *Paxylloma*, founded upon a French species, but of which the characters were very slightly indicated. In addition to these, the raising of one of the sections of the genus *Evania* into a distinct genus, under the name of *Brachygaster*, by Dr. Leach, (and under that of *Hyptia* by Illiger,) and the establishment of the Australian genus *Megalyra* by myself in "Griffith's Animal Kingdom," comprise all that has hitherto [1836] been done relative to the generic distribution of this group.

In the "Histoire Naturelle, &c." vol. xiii. Latreille placed this family amongst the "*Tripiles*," between the *Ichneumonidæ* and *Cynipidæ*, or *Gallflies;* but in his "Genera Crustaceorum et Insectorum" he placed it at the head of the *Pupophaga*, immediately preceding the *Ichneumonidæ*, in which situation it is retained in all his subsequent works.

Jurine divided the *Hymenoptera* into three principal sections, the first having the abdomen sessile, comprising the *Tenthredinidæ* and *Sirieidæ;* the second having the abdomen pedunculate, "petiolo supra thoracem infixo," containing the genera *Evania*, *Fœnus*,

* Note. In the lists of species of the different genera described below, the still more recent additions, up to the present time, so far as I am acquainted therewith, have been introduced.—*J. O. W., July* 12, 1844.

Aulacus, and *Stephanus;* and the third having the abdomen pedunculate, " petiolo ponè thoracem infixo," comprising the remainder of the order.

By Nees von Esenbeck, however, this family was placed at the end of the *Ichneumones adsciti* and immediately preceding the *Chalcididæ*, with the observation " Familiæ *Evanialium* verus character non tamen in oris et alarum fabrica, quam in abdominis insertione quærendus, cui quidem et alii characteres respondent, tum in oris, tum maxime in alarum structura et textura obvii. Alæ in *Evania* genere, nervis deminutis, ad eas *Pteromalinorum* et *Proctotrupinorum* propius accedunt."—(Hym. Mon. 1, 302.)

Mr. Haliday, in some observations upon the distribution of the *Pupivora* (Ent. Mag. vol. i. 343, note i), thinks it would be rash to divide this family into families, [as Mr. Shuckard,* and Mr. Haliday himself, but less extensively,† have since proposed,] the chain being so much interrupted from the small number of genera comprised in it; adding, " the family besides, is, in its present form, far too convenient a receptacle for all stray articles to be lightly resigned. I am obliged to enrich it further, at the expense of the *Ichneumones*, with two genera—*Stephanus* and *Plancus* [*Paxylloma*]—which *Pelecinus* and *Fœnus* seem respectively to reclaim: of the latter I am more doubtful; for the other I have the authority of Jurine and Spinola." Which latter observation he again repeats in the third volume of the same work, p. 22.

The investigation of the characters of these two genera subsequently detailed will enable us to judge of the propriety of this suggestion.

It is impossible to examine the structure of the insects of which this family is composed without arriving at the conclusion that it is evidently an osculant group, combining in itself not only the representatives of several other families, but also several distinct and anomalous forms. The paucity of species in the family, the strong variations which occur in various essential organs—as the antennæ, palpi, neuration of the wings, and especially the ovipositor, and the singularity of structure exhibited by various of the less important organs, as the elongation of the abdomen in *Pelecinus*, its singular position in *Evania*, the curious striation of the thorax in *Aulacus*, the form of the mandibles in *Fœnus*, and of the labial palpi in *Evania*,—all tend to prove that in comparison with the *Ichneumones genuini* the *Evaniidæ* are essentially an aberrant group.

Acting therefore upon the rule laid down by Mr. Mac Leay in

* Entomologist, p. 119. † Hym. Synops. in Suppl. Mon. Alysiæ, 1839.

the "Horæ Entomologicæ" relative to such groups, I do not here propose to detail any character for the family, and shall therefore only observe, that generally the antennæ are composed of only thirteen or fourteen joints, the abdominal peduncle is inserted at a considerable elevation upon the posterior part of the thorax, and the mandibles are toothed internally.*

From the various families of which the section *Pupivora* of Latreille is composed, with the exception of the *Ichneumones adsciti*, the *Evaniidæ* are easily distinguished. Thus the neuration of the wings will distinguish them from the *Chalcididæ;* the same character and the paucity of joints in the antennæ will separate them from the *Ichneumones genuini*, and the structure of the ovipositor from the *Cynipidæ*, *Proctotrupidæ*,† and *Chrysididæ*. From the *Ichneumones adsciti* however, at least from the most aberrant species of that group, the line of demarcation is less evident, since we find some of the *Aphidii* in that family possessing antennæ with not more than fourteen joints, and the genus *Paxylloma*, under its various names of *Plancus* and *Hybrizon*, has been placed both amongst the *Evaniidæ* and the *Ichneumones adsciti*.

With these preliminary observations I proceed to a review of the genera *Evania* and its allies, proposing to insert, under each, descriptions of such new species as have occurred to me, commencing with those genera which have the abdomen destitute of an exserted ovipositor.

Evania, Fabr.

The chief character of this genus consists in the very small size of the abdomen, which is greatly compressed, of a triangular form, and attached to the thorax, rather above the centre of the metathoracic scutellum (and not at its posterior extremity as in most other *Hymenoptera*‡), by a peduncle about as long as the

* I have not made use of the number of joints in the palpi as a character of the family, since it is evident, from analogy with the aberrant *Ichneumonidæ*, that variation in their number is a necessary consequence of such aberration; a remarkable proof of this occurs in *Evania*, some species of which, even in its restricted state, possess apparently only five joints to the maxillary palpi and others six. *Vide* Lat. Gen. 3. 251. 2.

† The relationship of *Pelecinus* to *Proctotrupes* will be considered in the observations on the former genus.

‡ This peculiarity, although it appears at first sight anomalous, is dependent upon the excessive development and thickness of the metathorax, of which the præscutum is reduced to a very slender dorsal piece, having the posterior wings attached at its sides; the metascutellum and postscutellum being confluent, although the limits of the metascutellum are indicated (of a triangular form and small size,

remainder of the abdomen. The ovipositor is not exserted. The antennæ are thirteen-jointed in each sex, the basal joint in the females being more elongated, so as to form, with the remainder, a considerable elbow. Jurine describes the antennæ as being thirteen or fourteen-jointed according to sex, but incorrectly.

The species of this genus were discovered (as we learn from Kirby and Spence*) to be parasitic upon the species of *Blattidæ*. The correctness of this statement has been confirmed to me by Mr. R. E. Lewis, who has found them on board the ship in which he sailed to Van Diemen's Land, and which was much infested with *Blatta orientalis;* and hence the *Evaniæ minuta* and *fulvipes*, having been found in situations where the indigenous *Blatta Lapponica* abounds, are alone regarded by Mr. Stephens as strictly entitled to be considered indigenous; the typical species *Evania appendigaster*, which is attached to the *Blatta orientalis*, being considered an imported insect.—(Illustr. of Brit. Entomology, Mand. vol. vii. p. 118.)

Latreille introduced two primary divisions into this genus, founded upon the distinctness or obliteration of the apical nerves of the wings and the length of the second and third joints of the antennæ. These divisions Dr. Leach regarded as generic, and accordingly, in the Edinburgh Encyclopædia, gave the name of *Brachygaster* to the second section, having the *Evania minuta* as its type. (In the British Museum Cabinet the genus however stands under the name of *Coranila* of Leach's Manuscripts.) This genus *Brachygaster* has been retained by Mr. Stephens. Illiger, however, in his edition of Rossi, had previously named it

terminating at the place of insertion of the abdomen) by an impression; the metapostscutellum being exceedingly developed. (Mod. Class. of Insects, vol. ii. p. 134, fig 74, 4 and 5.) The metasternum is also very remarkable, terminating in a strong furcate process, of which the points are recurved and fitting into the posterior coxæ.

* In the third volume of the Introduction to Entomology (p. 580) it is stated, that "the history of *Evania*, the parasite of the *Blattæ*, had been traced by Dr. Reid, who did not however live to give his discoveries to the world; it was however hoped that they would not be lost, being in most able hands." In the fourth volume of the same work (p. 216) it is however stated, that "the late Dr. Arnold, whose tact for observation with regard to the manners and economy of insects has rendered his loss irreparable, discovered that the remarkable parasitic genus *Evania* F. was appropriated to the all-devouring *Blattæ*: whether it attacked it in its egg or larva state the author had not been informed. This little benefactor is here extremely rare, at least in the country; perhaps in towns where the cock-roach abounds it may be more common." I am however indebted to Mr. W. S. Mac Leay for the information that it is within the egg-pouch of the *Blattæ* that the *Evania* is parasitic.

Hyptia. Dr. Nees von Esenbeck has however regarded its characters merely as specific ones.

Evania, in its restricted state, comprises several species very closely allied together, and the name of *Evania appendigaster* having been indifferently applied to them, much confusion has been thereby occasioned. Latreille endeavoured, but unsuccessfully, to rectify the error, which was accomplished by Illiger. Mr. Curtis however, followed by Mr. Stephens, has again renewed the confusion, by giving the *fuscipes* of Illiger (*appendigaster*, Latr.) under the name of *flavicornis*—(describing it as possessing rufous antennæ)—and by giving the *lævigata* of Latreille as identical with the Linnæan *appendigaster;* whilst the Marquis Spinola has reversed the synonymy, by giving *fuscipes* and *appendigaster* as identical, and *lævigata* as distinct. Fabricius gives, as the localities of *Evania appendigaster*, Southern Europe, Cape of Good Hope, and New Holland; and Mr. Curtis adds America, Jamaica, the Isle of France, Spain, and England, evidently confusing the true *lævigata* and *appendigaster*, and probably several other species.

Sp. 1. *Evania appendigaster*, Linn. (*Sphex a.*). Illiger, N. ab Esen., Curtis, Stephens, nec Latreille nec Spinola.

In the Linnæan cabinet the specific ticket of *E. appendigaster* is attached to a black insect, with the face neither punctured nor striated; the mesothorax nearly smooth, with only a very few punctures scattered about the scutum, with an impressed oblique line on each side, and a shorter straight one between it and the base of the wings; the peduncle of the abdomen is also slightly contracted before the tip, the sides immediately in front of the contraction being slightly flattened out. It is also smooth, being neither punctured nor striated.

I have carefully examined specimens from England, Germany, the Island of Mauritius, Mozambique, and Brazil, amongst which I cannot perceive any character to warrant their specific separation.

Sp. 2. *Evania lævigata*, Latreille, Olivier, Illiger.

The Marquis Spinola gives Mexico, New Orleans, Brazil, the Cape of Good Hope, Egypt, Greece, Sardinia, Coromandel, and New Holland, as places from which he has received *E. lævigata*.

Sp. 3. *Evania fuscipes*, Illiger.

Syn. *Ev. appendigaster*, Latreille, Oliv., Jurine, Panzer.
Ev. flavicornis, Curtis, Stephens.

Closely allied to the two preceding species are the two following:—

Sp. 4. *Evania Cubæ*, Guerin, Icon. R. An. Ins. pl. 65, fig. 1.

Inhabits the island of Cuba, but of which the description is not yet published. The abdomen of the male is figured of a more ovate form, and terminated by a small conical appendage, whilst that of the female is much less strongly securiform.

Sp. 5. *Evania Desjardinsii*, Blanchard, Hist. Nat. Ins. vol. iv. p. 299.

Inhabits the Isle of France, "le seul caractere" consists in the abdomen, which "n'est plus complètement sécuriforme, mais il est beaucoup moins large et presque cylindrique, quoique toujours très fortement comprimé lateralement."

Sp. 6. *Evania princeps*, Westw.

Tota nigra, facie argenteo-sericea longitudinaliter striata, thorace rude punctato, alarum anticarum vena radiali ad apicem recurvo ♂ ♀.

Long. corp. lin. 7, exp. alar. lin. $10\frac{1}{2}$.

Habitat in Nova Hollandia.

In Mus. Dom. Hope, Newman et nostr.

Gigas in genere. Tota nigra. Caput, thorax et abdominis petiolus rudè punctata, metathorace areolato, facie longitudinaliter striata et lateribus capitis thoracisque argenteo-sericeis. Mandibulæ intus 3-dentatæ, palpi labiales articulis simplicibus. Alæ infuscatæ, vena radiali ad apicem recurvata. Furca metasterni brevissima recta. Abdomen valdè compressissimum, subtriangulare. Differt mas facie minus striata.

Sp. 7. *Evania Abyssinica*, Westw.

Nigra, thorace et petiolo abdominali rufis, pedibus piceis, facie punctata ♀.

Syn. *Evania thoracica*, Klug. MSS., nec *Ev. thoracica*, Blanchard.

Long. corp. lin. $3\frac{3}{4}$, exp. alar. lin. $6\frac{1}{4}$.

Habitat in Abyssinia.

In Mus. nostr. Communic. cel. Dom. Klug.

Magnitudo *Ev. appendigastris*. Antennæ longæ nigræ, subtus piceæ. Caput nigrum, facie parum argenteo-sericea, punctis parvis impressis, haud confluentibus, carinaque abbreviata mediana sub antennas. Mandibulæ nigræ, apice piceo. Palpi piceo-rufi. Thorax ferrugineus, tenue punctatus, metathorace

areolato; petiolus abdominis ferrugineus, haud punctatus, utrinque striola tenui longitudinali. Abdomen nigrum, compressum, nitidum, fere rotundatum. Pedes quatuor antici picei (femoribus subtus ferrugineis), postici nigri, trochanteribus basi piceis. Alæ fere hyalinæ, venis nigris, vena marginali (cellulam marginalem formanti) ad apicem fere recta et cum margine apicali alæ fere parellela.

Sp. 8. *Evania dimidiata.*

Syn. *Evania dimidiata*, Spinola, in Ann. Ent. Soc. de France, tom. vii. p. 439, and Rev. Zool. 1840, p. 247.
Habitat in Ægypto.

Obs. This species appears to differ from *E. Abyssinica* in its smaller size (2½ lin.), black antennæ and legs, pale palpi, slightly punctured face, ferrugineous mandibles, and punctured peduncle. They are however stated by the Marquis Spinola, in the Rev. Zool. 1842, p. 190, to be identical.

Sp. 9. *Evania Tasmanica*, Westw.

Nigra punctatissima, facie tenuiter longitudinaliter striata, furcâ metasterni brevi rectâ, petiolo striato ♀.
Long. corp. lin. 4½, exp. alar. 8.
Habitat in Terra Van Diemenii.
In Mus. Dom. Hope.

Tota nigra, rude punctatissima. Facies sub antennarum insertionem leviter striata. Petiolus abdominis striatus. Abdomen compressissimum, triangulare. Alæ hyalinæ, area marginali sub-ovata, venis cubitali et discoidali fere obsoletis. Antennæ et pedes nigri. Mandibulæ intus obtuse 3-dentatæ. Palpi labiales articulo 3tio apice dilatato ovato.

Sp. 10. *Evania punctata.*

" E. nigra albido-villosa, capite striato, vertice thoraceque crasse punctatis, alis subhyalinis, nervis nigris; antennarum basi, palpis, et pedibus quatuor anticis fere omnino pallide fuscis, abdominis petiolo valde rugoso. Long. corp. 9 millim."
Habitat in Morea.
Syn. *E. punctata*, Brullé, in Exped. Scient. de Morée, p. 378, No. 833.

Obs. This species appears scarcely to differ from *E. fuscipes*.

Sp. 11. *Evania fascialis.*

Syn. *Evania fascialis*, Spinola, in Rev. Zool. 1842, p. 188.
Habitat in Mexico.

Sp. 12. *Evania Chilensis.*

Syn. *Evania Chilensis*, Spinola, in Rev. Zool. 1842, p. 189.
Habitat in Chili.

Sp. 13. *Evania antennalis*, Westw.

Nigra, antennarum articulis 3 et 4 luteis, facie longitudinaliter striata, petiolo oblique rugoso, metasterno parum furcato.
Long. corp. lin. 3.
Habitat in India Orientali, Bombay. Dom. W. Elliott.
In Mus. Britann.

Nigra, antennis crassiusculis et breviusculis; articulis 3 et 4 luteis, facie genisque longitudinaliter striatis, illa carina mediana instructa; fossulis duabus pro receptione articuli basalis antennarum distinctis latis, at parum profundis; thorace punctato, metathorace hexagonaliter areolato, griseo-pubescenti; petiolo abdominis elongato, oblique rugoso; abdomine compressissimo, latè ovato, apice acuto, metasterno brevi, parum furcato; trochanteribus magnis, glaberrimis, tibiis anticis, tarsisque 4 anticis piceis; alarum venis fere ut in *E. lævigata* cellula marginali postice vix angulata.

Sp. 14. *Evania compressa*, Fabr. Syst. Piez. p. 178.
Habitat in America Meridionali.

Sp. 15. *Evania nigricornis*, Fabr. Syst. Piez. p. 179.
Habitat in America.

Sp. 16. *Evania caspia*, Eichwald, in Reise auf d. Casp. Meere, &c. Bd. 1, Abth. 1 and 2.

Sp. 17. *Evania affinis*, Le Guillou, in Rev. Zool. Soc. Cuvierr. 1841, p. 322.

"*E. appendigastræ* affinis, sed minus pilosa, atra; lamella longitudinali et triangulari supra thorax; unguiculo terminali ultimi tarsi bifido et fulvo; thorace profundè punctato; abdomine lævi et rufo."
Long. corp. 7½ mill.
Habitat Hamoa (Arch. des Navigateurs).

Sp. 18. *Evania* (*Hyptia*) *minuta*, Fabr. Ent. Syst. 2, 194, Coq. pl. IV. fig. 9.

Habitat in Europa.

Sp. 19. *Evania* (*Hyptia*) *petiolata.*

Syn. *E. petiolata*, Fabr. Ent. Syst. Suppl. p. 242.
Habitat in Insulis Americæ.

Sp. 20. *Evania* (*Hyptia*) *rufipes.*

Syn. *E. rufipes*, Fabr. Syst. Piez. p. 179.
Habitat in America Meridionali.

Sp. 21. *Evania* (*Hyptia*) *pygmæa.*

Syn. *E. pygmæa*, Fabr. Syst. Piez. p. 180.
Habitat in America Meridionali.

Obs. The last three species are now preserved in the Royal Museum of Copenhagen, and have been lately examined by Dr. Erichson, who has been so kind as to supply me with notes respecting them as well as numerous other Fabrician species.

Sp. 22. *Evania* (*Hyptia*) *Javanica*, Westw.

Tota nigra punctata, petiolo oblique striato, brevi; alarum venis cubitali et discoidali obliteratis ♀.
Long. corp. lin. 3, expans. alar. lin. 5.
Habitat in Insula Java.
In Mus. Dom. Hope.

Tota nigra, capite mesothoraceque punctatis, metathorace areolata. Facies punctata, punctis irregularibus et plus minusve confluentibus. Scutum mesothoracis utrinque linea oblique impressa, ex angulis anticis ad medium fere ducta, conjunctim litteram V fere formantibus. Furca metasterni brevis, fere recta. Petiolus abdominis brevis (vix tertiam partem abdominis longitudine æquans), paullo curvatus, oblique striatus. Abdomen triangulare, compressissimum, segmentis apicalibus dorso parum villosis. Alæ hyalinæ, stigmate venisque nigris, harum cubitali et discoidali omnino obliteratis.

Sp. 22. *Evania* (*Hyptia*) *ruficornis.*

Syn. *Evania ruficornis*, Fabr. Syst. Piez. p. 179.
Habitat in America Meridionali.

Sp. 24. *Evania* (*Hyptia*) *fulvipes.*

Syn. *Evania fulvipes*, Curtis, Brit. Ent. pl. 257.
Habitat in Anglia.

Obs. This species is apparently very closely allied to *E.* (*Hyptia*) *minuta.**

Sp. 25. *Evania* (*Hyptia*) *bicolor*, Westw.

Ferruginea, abdomine piceo-nigro, antennis pedibusque nigris.
Long. corp. lin. $2\frac{1}{2}$, expans. alar. lin. $5\frac{1}{2}$.
Syn. *Coranila thoracica*, Leach, MSS. in Brit. Mag.
[*Hyptiam thoracicum*, Shk. Entomol. p. 120.]
Evania thoracica, Blanchard, Hist. Nat. Ins. vol. iv. p. 299.

Ferruginea, punctata, abdomine lævi nitido. Caput piceum, vertice rufescenti. Antennæ in medio crassiores, nigræ, apice articuli basalis piceo. Thorax ferrugineus, postice pilis argenteis vestitus. Pedunculus abdominis niger, apice piceo. Abdomen piceo-nigrum. Alæ leviter tinctæ, stigmate nigro, vena cubitali alteraque brachiali abbreviata, cellulis destitutæ. Pedes nigri, geniculis piceis.

Obs. I believe it is this species which Abbot has delineated in the twelfth volume of his unpublished drawings in the British Museum Library, Number X. 75, from a specimen taken on the 27th August in Oakwoods, in Burke County. He figures it as being $3\frac{1}{2}$ lines long by 5 in expanse, and of a red brown colour, with the legs and antennæ darker.

Sp. 26. *Evania* (*Hyptia*) *reticulata.*

Black, first joint of the antennæ and anterior pairs of feet piceous.—(Say, in Journ. Nat. Hist. Soc. Boston, 1836, vol. i. p. 223, *Brachygaster r.*)
Inhabits Indiana.

"Body black, reticulate with large punctures; antennæ not longer than the trunk, with close set subequal joints; first joint subclavate, piceous, longest; second joint not longer than broad, shortest, about half the length of the third; punctures on the posterior face of the metathorax, more dilated than those of the thorax; wings hyaline, nervures fuscous; petiole about as long as the

* Indeed, according to the Marquis Spinola, it would appear to be only a variety of that species.

abdomen, punctured; abdomen orbicular, polished, unpunctured; feet, two anterior pairs, piceous."

Length about one-fifth of an inch.

Sp. 27. *Evania* (*Hyptia*) *Xanthops.*

Syn. *Brachygaster Xanthops*, Shk. in Entomologist, p. 120.
Habitat in Brasilia.

Sp. 28. *Evania* (*Hyptia*) *ruficeps.*

Syn. *Hyptiam ruficeps*, Shk. in Entomologist, p. 121.
Habitat in Brasilia.

Sp. 29. *Evania* (*Hyptia*?) *animensis.*

Syn. *Evania animensis*, Spinola, in Rev. Zool. 1840, p. 247.

Found in gum anime. The fusiform antennæ, and presence of radial and cubital cells, seem to separate it from all the other known species. Mr. Kirby also mentions an *Evania* observed by him in gum. Introd. to Ent. iv. p. 556. I also possess a distinct species in gum anime, but cannot determine its characters.

Sp. 30. *Evania* (*Hyptia*) *crassicornis.*

Syn. *Evania crassicornis*, Spinola, in Rev. Zool. 1842, p. 189.
Habitat in Colombia.

Obs. *Evania tincta, fasciata, histrio, maculata, punctum, ruficollis, sessilis*, and *variegata*, of the early works of Fabricius, belong to the genus *Ceropales.*

Pelecinus, Latreille.

This genus is at once distinguished from *Evania*, with which it agrees in the hidden ovipositor, in having the abdomen greatly elongated, that of the females being at least six times the length of the head and thorax, slender and cylindrical, the basal joint being the thickest. In the opposite sex (Pl. XIV. fig. 1) the abdomen is about twice the length of the head and thorax, and gradually clavate, the basal joint being very long. Latreille, unaware of this sexual diversity, gave the male, as a distinct species, under the name of *Pel. clavator.* The abdomen is attached to the metathorax much lower than in *Evania*, and the posterior tibiæ are remarkably dilated in the females into an elongate ovate mass. In the opposite sex they are more slender. The basal joint of the

two posterior tarsi is very short, the fourth also is short and somewhat dilated, the terminal joint being inserted before the extremity so as to sit obliquely. The antennæ, which are described by Fabricius (Syst. Piez. p. 111) as 12-jointed, and by Latreille (Gen. Cr. 3, 255) as 13-jointed, are distinctly 14-jointed in each sex, the basal joint being short and thick, the second much shorter and cup-shaped, and the remaining twelve long, very slender, and cylindric. In both sexes they are annulated with white near the extremity.

The parts of the mouth of this genus not having hitherto been figured, I have thought it might be serviceable to add figures of them, more especially as it will be seen that the descriptions given both by Fabricius and Latreille in the works above quoted (and copied by Saint Fargeau and Serville into the Encyclopedie Méthodique, vol. x. p. 29) do not at all correspond with my figures.* Thus Fabricius describes the mandible as "intus tridentata, apice acuta." Latreille states the maxillary palpi to be 6-jointed, and the labial 4-jointed, whilst Fabricius describes the same organs as being respectively 5-jointed and 4-jointed; whereas they are in fact respectively† 5-jointed and 3-jointed. (Plate XIV. fig. 2*a*, represents the head of the female seen in front; 2*b*, the same seen side ways; 2*c*, the labrum; 2*d*, the mandible; 2*e*, the maxilla; and 2*f*, the labium and its palpi.) The neuration of the wings in this genus is very unlike that of any other Hymenopterous genus, as will be seen from my figure; in which the parts dotted are only very slightly indicated, and can be seen only by shifting the wings in various directions. With the view of exhibiting the manner in which the variation in the position of the veins in this and several allied genera is effected I have given a figure of the wing of *Pelecinus*, Pl. XIV. fig. 1*a*, and have added figures of those of *Monomachus* (Pl. XIV. fig. 5*a*), *Fœnus* (Pl. XV. fig. 2), and *Proctotrupes* (Pl. XIV. fig. 10); the last named genus being considered by Dr. Erichson as brought into close relation with *Pelecinus* by means of *Monomachus*. The analogous veins in the figures of the wings are similarly lettered. That *Proctotrupes* is indeed closely allied to *Pelecinus* is perhaps unquestionable;‡ and, in

* Of the correctness of these figures I will only observe, that they have been made from an examination of many female specimens of *Pel. politurator*, and from actual dissection of two individuals.

† It appears to me that Latreille has mistaken a slight swelling near the base of the fourth joint for an articulation.

‡ Mr. Haliday (Hym. Synops. ii. in Hym. Brit. Alysia) has formed *Pelecinus* into a family of the *Oxyura*, separating it from the *Evaniadæ* on account of its trochanters being exarticulated.

retaining the latter genus in the present family, I have, perchance, been too much influenced by the authority of Latreille, and have too much relied upon the general resemblance exhibited by the veining of the wings and singular hind feet of *Pelecinus* and *Fœnus*, which may prove but analogous relations, although *Evania* proves to us that the veins of the wings even in the typical genus may be subject to become obsolete. In one character, indeed, *Proctotrupes* differs from *Pelecinus*, the former having only four joints to the maxillary palpi, whilst they are 5-jointed in the latter.*

The tarsal ungues are entire in *Pelecinus*. The male differs only from the female in the structure of the abdomen, as noticed above; unlike the latter, in which the segments are of nearly equal length, the basal joint alone equals three-fourths of the entire length of the abdomen. The basal portion is slender and cylindric, but about the middle of the segment there is a kind of knot which has the appearance of an articulation, and beyond this knot the segment is gradually incrassated. The four remaining segments are very short.

This genus was instituted by Latreille in the "Bulletin de la Société Philomatique," No. 44 (1797—1801), and was adopted by Fabricius in his "Systema Piezatorum," from the third volume of Latreille's "Histoire Générale," &c. p. 329.

Sp. 1. *Pelecinus politurator.*

The typical species was originally figured by Drury† under the name of *Ichneumon polyturator*, the latter name being evidently a misprint for *politurator*, being intended to apply to the highly polished appearance of the insect. This name was however changed by Latreille and Fabricius into the unmeaning title *polycerator*, which must of course be rejected. It was described by Fabricius under the name of—

Ichneumon polycerator, Fabr. Sp. MS. 1, 430, No. 63; Mant. Ins. 1, 265, 75; Gmelin, p. 2691, 141.‡

Pelecinus polycerator, Latr. Fabr.

Drury received his specimen from Jamaica, but Fabricius gave

* Mr. Curtis figures them in *Proctotrupes* as 5-jointed, but in his description he expresses his doubts as to this being their true structure. My dissections (Introd. to Mod. Class. vol. ii. p. 167, fig. 78, 4) agree with the description of Latreille, Haliday, and Nees von Esenbeck.

† Illustr. Exot. Ent. vol. ii. pl. 40, fig. 4.

‡ Latreille, Hist. Nat. 13, 195, refers to Linnæus, probably by mistake for Gmelin.

India as the locality of this species, from the information of Dr. Fothergill. This, however, is incorrect, it and all the other species of the genus being inhabitants of America.

The following is a description of the male, from specimens in the collection of the British Museum, and which is represented in Pl. XIV. fig. 1.

Black, shining; four anterior tibiæ and tarsi brown; two basal joints of posterior tarsi black, the remainder dirty white; the wings having the costa and apex brown, the costa being the darkest part.

Length 7 lines, expansion of wing $10\frac{1}{2}$ lines.

Specimens of the males are also preserved in the Royal Museum of Berlin, where, upon the authority of Dr. Klug, they are ticketed *Pel. clavator*, Latr., of which the following is the description:—

"*Pelecinus* niger, antennarum articulo 10mo tarsorumque duorum posticorum articulis intermediis albidis, abdomine clavato." —Latr. in Dict. d'Hist. Nat. edit. 2.

As, however, the habitat given is Brazil, it is perhaps the male of another species. The specific name is at all events inappropriate, being applicable to the males of all the species both of this and the following genus.

I have received many specimens of *Pelecinus politurator* from North America, and Dr. Harris has introduced it into his catalogue of the insects of Massachusets, as well as *Pel. clavator*. It is also figured by Say in his American Entomology, vol. i. pl. 15, who states that it is not uncommon in various parts of the United States.

Since this memoir was prepared, the Baron de Romand has published a note on this genus in Guérin's Magasin de Zoologie, 1840, Ins. pl. 48 and 49, figuring the males of two supposed species under the names of *P. polycerator* and *polyturator* (not perceiving their identity and relying on the different spelling of the name, as I had written the latter name on the sketch of the male which I gave him when in London).

Dr. Klug, in his description of the species of this genus in the Berlin collection, describes three varieties of *P. politurator* varying in the punctation of the scutellum and metathorax, from North America, Mexico, Columbia, and Brazil.

In the "Delectus Animalium," &c., of Drs. Spix and Von Martius, Dr. Perty has described three species as belonging to this genus, the third of which, however, is referable to *Monomachus*. The following is the description of the two other species:—

Pelecinus tibiator, Perty, Del. An. Art. Bz. p. 131.
(*Pel. polycerator*, id., pl. 26, fig. 8.)

" Niger, abdomine longissimo filiformi, alis albidis, stigmate
" et margine antico brunneis, tibiis posticis incrassatis,
" antennæ annulo albo.
" Long. corp. lin. $17\frac{1}{2}$, abd. $14\frac{1}{2}$, lat. $11\frac{1}{2}$.
" A *Pel. clavatore*, Latr., differt præter alias notas etiam magnitudine."

Note.—Dr. Klug gives this as identical with *P. politurator*.

Sp. 2. *Pelecinus dichrous*, Perty, loc. cit. Klug, in Germar, Zeitsch. d. Ent. iii. p. 383.

" Alis pellucidis, venis longitudinalibus et stigmate brunneis,
" thorace pedibusque sordide sanguineis, abdomine nigro,
" tibiis posticis clavatis. Magnitudo *Pel. tibiatoris*."

Syn. *Pel. clavator* ♀, Spinola, in Guér. Mag. de Zool. 1842, pl. 93, fig. 1.

Sp. 3. *Pelecinus Guerini*, De Romand, in Guérin, Mag. de Zool. 1840, fig. 2 ♀, pl. 93, fig. 2 ♂.

Sp. 4. *Pelecinus rufus*, Klug, in Germar, Zeitsch. d. Ent. iii. 384, tab. 2, fig. 2, 3.

Habitat in Brasilia.

Sp. 5. *Pelecinus thoracicus*, Klug, in Germar, Zeitsch. d. Ent. iii. 384, pl. 2, fig. 5.

Habitat in Mexico.

Sp. 6. *Pelecinus annulatus*, Klug, in Germar, Zeitsch. d. Ent. iii. 384, pl. 2, fig. 4.

Habitat in Monte Video.

Sp. 7. *Pelecinus Duponchellii*, De Romand, Guér. Mag. d. Zool. 1842, pl. 86, fig. 1, 1 b.

Sp. 8. *Pelecinus Spinolæ*, De Romand, in Guér. Mag. d. Zool. 1842, pl. 86, fig. 2.

Monomachus, Klug, MSS.

No characters of this genus have been hitherto published, nor am I aware that any of the species have been described, except the one mentioned above by Perty. In the elongated form of the abdomen, the concealed ovipositor of the female, and the clavation of the abdomen of the males, it approaches *Pelecinus;* but in the structure of the head, antennæ, posterior tibiæ, and tarsi, and the neuration of the wings, it is very distinct from that genus. I have not had an opportunity of examining the trophi. The following are its principal characters:—

Caput crassum, genis plus minusve dilatatis (Pl. XIV. fig. 3*a*, caput maris; 4*a*, caput feminæ). *Mandibulæ* magnæ, validæ, intus 1-dentatæ. *Palpi* graciles. *Antennæ* elongatæ ♂, 14-articulatæ, corpore toto longiores (fig. 5*b*), articulo basali parvo crasso, 2do minuto, reliquis cylindricis elongatis, longitudine æqualibus; ♀ 15-articulatæ (fig. 4*b*), articulis versus apicem gradatim crassioribus et brevioribus. *Thorax* oblongo-ovatus. *Collari* valde conspicuo obtrigono. *Alæ* (fig. 5*a*) nervis distinctis, cellulâ unicâ marginali parvâ elongato-triangulari, cellulisque duabus submarginalibus, quarum prior grandis, altera ad apicem extendit, cellulis discoidalibus distinctis. *Alæ* posticæ nervis distinctis. *Pedes* sat graciles, postici formæ ordinariæ. *Abdomen* ♂ capite cum thorace duplo longius, segmento 1mo pedunculiformi, gracili, cylindrico, dimidii abdominis longitudine, segmentis reliquis 5 clavam elongato-ovatam formantibus, basalibus majoribus; ♀ (fig. 4*c*) capite cum thorace fere quadruplo longius, gracile, curvatum, in medio subinflatum et ad apicem valde acuminatum, (oviductu occulto,) 7-annulatum, segmento 2do latiori.

Genus *Brasiliense*.

Sp. 1. *Monomachus Klugii*, (Plate XIV. fig. 4).

Ferrugineus, abdomine piceo nigro, pedunculo ferrugineo, alis pallidè tinctis, cum maculâ fuscâ terminali, genis valdè dilatatis, antennis fuscis pedibusque rufescentibus ♀.

Long. corp. lin. 10½, expans. alar. lin. 10.

Mon. lanceolatus, Klug, MSS.

Habitat in Brasilia.

In Mus. Reg. Berolinensi.

Sp. 2. *Monomachus lateralis*, Klug, MSS. (Pl. XIV. fig. 3.)

Niger, tenue punctatus, abdomine subpiloso, mandibulis luteo-fuscescentibus, pedibus 4 anticis (cum coxis pallidè albidis) luteo-fuscis; femoribus in medio obscurioribus; pedibus 2 posticis cum coxis nigro-fuscis; abdomine luteo-marginato; alis hyalinis immaculatis ♂.

Long. corp. lin. $5\frac{1}{2}$, expans. alar. lin. $8\frac{1}{2}$.

Habitat in Brasilia. Sello.

In Mus. Reg. Berol.

Sp. 3. *Monomachus segmentator.*

Obscurè flavescens; capitis vertice fusco variegato, collare maculâ sublunatâ fuscâ; mesothorace fusco, metathorace nigro, punctato, pedunculo supra nigro, infra flavido, segmentis reliquis abdominalibus piceis, marginibus maculâque cuneatâ ad basin segmenti 3tii utrinque flavidis; abdomine setis tribus minutis terminato; capite thoraceque subtus articulisque basalibus pedum obscure flavidis, pedibus posticis fuscis; antennis corpore longioribus, filiformibus, articulo 1mo crasso, 2ndo minuto, reliquis longitudine æqualibus. ♂. (Fig. 5 *a*, ala, 5 *b*, antenna, ♂.)

Long. corp. lin. 6, expans. alar. lin. 6.

Habitat ——?

In Mus. Britt.

Sp. 4. *Monomachus fuscator.*

" Brunnescenti-niger, pedibus et abdomine parum dilutioribus, " hoc ad medium inflato, ad apicem acuminato; antennis " unicoloribus, ad apicem perpaullum crassioribus; alis " minime infuscatis, tibiis posticis parum incrassatis" ♀.

Long. corp. lin. $7\frac{1}{2}$.

Habitat in Brasilia.

Syn. *Pelecinus fuscator*, Perty, Delect. Animal. Art. Braz. No. 3.

Sp. 5. *Monomachus gladiator*, Klug, MSS. (spec. indescr.)

Habitat Bahia. Gomez.

In Mus. Reg. Berol.

Sp. 6. *Monomachus apicalis*, Klug, MSS. (spec. indescr.)

Habitat in Bahia Brasiliæ, M. Von Winthem.

In Mus. Reg. Berol.

Sp. 7. *Monomachus falcator*, Klug. MSS. (spec. indescr.)

Habitat St. Joan del Rey. Sello.

Obs. C. Darwin, Esq., brought home a species of this genus, which has for some time past been in the hands of W. E. Shuckard, Esq., for description.

The three following genera are at once distinguished from the preceding by having the ovipositor long and exserted.

Fœnus, Fabricius.

This genus is remarkable on account of several peculiarities which it exhibits. The strongly dentated mandibles, the minute tongue-like labrum, the antennæ composed of thirteen joints in the male and of fourteen in the female, the elongated prothorax forming a long neck, the singular posteriorly dilated parapsides of the mesothoracic scutum (giving the appearance in some species of a separate subsegment), the insertion of the abdomen close to the mesoscutellum, the clavate hind legs, and the curious arrangement of the veins of the wings (Pl. XV. fig. 2), are all exceedingly characteristic, and render this one of the most isolated genera. I have illustrated the majority of these characters with figures in the "Introduction to the Modern Classification of Insects," vol. ii. p. 134.

Latreille appears to have dissected a female, since he describes only the mandibles of that sex; and Mr. Curtis, who dissected *F. assectator*, figures these organs as of a different form in the two sexes. In all the specimens of *F. jaculator*, *australis*, and *unguiculatus*, which I have dissected, including males and females, they were alike in form, all having a very strong and acute basal tooth within, which appears wanting in the male of *assectator*.

The labium also in *F. jaculator* and *unguiculatus* was much longer than in Mr. Curtis's figure.

The inferior wings are destitute of cells, the veins being almost obsolete.

The following is a monograph of all the species of the genus

hitherto described, or which I have met with in various collections :—

Sp. 1. *Fœnus jaculator.*

Niger, mesothorace transversè striolato, abdomine medio rufo, oviductu longitudine corporis, vaginis apice albis, tibiis posticis basi maculâ albâ notatis.

Long. corp. cum terebra ♀ lin. 11—13, (10½ Dahlb.)

Habitat per totam Europam.

Syn. *Ichneumon jaculator*, Linn. Faun. Suec. p. 406, 1626; Fabricius, Ent. Syst. 2, p. 177; *Fœnus jaculator*, Fabr. Ent. Syst. Suppl. 240; Syst. Piez. p. 141; Nees ab Esenb. Hym. Mon. 1, 307; Dahlbom, Exerc. Hym. pars 6, p. 76; Westwood, Introd. Mod. Syst. 2, p. 134, fig. 74, 8—16; Zetterstedt, Ins. Lapp. p. 408.

Obs. Fabricius tibias posticas "basi apiceque albis" describit, et Neesius et Curtisius easdem partes nigras basi albas (annulo albo, Curt.), tarsis fuscis, posticorum 1mo articulo albo, sed de diversitate sexuum in colore harum partium tacent. Dahlbomius tibias et tarsos pedum posticorum in utroque sexu annulis basalibus albis describit, et Zetterstedtius "tibias posticas basi sæpe etiam articulum primum tarsorum annulo albo instructo." Specimina plurima utriusque sexus ipse cepi, omnia inter se (secundum sexum) congruentia, in quibus tibiæ posticæ omnium maculam albam in facie interna tibiarum posticarum (nec vero annulum) exhibent, articuloque basali tarsorum posticorum in fœminis (basi excepto) albo, in maribus vero tarsis omnino nigris. Differt fœmina abdominis colore rufo obsoleto; talem descripsit Geoffroius (Hist. Ins. Paris, 2, p. 328, *Ichneumon*, No. 16).

Sp. 2. *Fœnus assectator.*

Niger, mesothoracis tergo subtilissime varioloso, abdomine latere rufo maculato, tibiis posticis interdum basi albidis; mandibulis nigris, apice rufis; oviductu tibiarum posticarum longitudine vaginis nigris.

Long. corp. ♀ circiter lin. 5—7, lin. (3½—4½, Dhlb.)

Habitat per totam Europam.

Syn. *Ichneumon assectator*, Linn. Faun. Suec. p. 407; *Fœnus affectator*, Fab. Ent. Syst. Suppl. p. 240; Esenb. Hym. Monogr. 1, p. 308; *Fœnus assectator*, Curtis, Brit. Ent. pl. 123 ♀; Dahlb. Exerc. Hym. p. 77.

Sp. 3. *Fœnus Esenbeckii*, Westw.

Piceo-rufus, mesothoracis tergo evidentius rugosulo; antennis rufis, articulo 3tio fusco; mandibulis rufis, apice nigris; alis lutescenti-hyalinis, areolâ minutâ discoidali subconicâ; oviductu abdomine quadruplo breviori ♀.

Long. corp. (absque oviduct.) lin. 4, oviduct. $\frac{3}{4}$.

Habitat in Germania, prope Sickershausen.

Syn. *Fœnus affectator*, var. β N. ab Esenb. Hym. Monogr. 1, p. 309.

Certe è *F. assectatore* species distincta, coloribus sculptura et forma areolæ discoidalis diversa; caput rufum, vertice piceo, antice albo-sericanti, maculâ piceâ subtus insertionem antennarum; mandibulæ rufæ, apice nigræ; antennæ rufæ, articulo tertio et apicali fuscis; collum nigrum, mesothoracis tergum evidentius rugosulum, nigro-piceum; pectus nigrum, laterâ thoracis et metathoracis rufâ; abdomen fuscum, segmentis intermediis apice fulvis; oviductus abdomine quadruplo brevior, vaginis nigris; coxæ nigræ; pedes rufi, femoribus 4 anticis medio piceis; alæ flavido-tinctæ, areolâ minutâ discoidali versus apicem evidenter angustiori (in *F. assectatore* fere parallela).

Sp. 4. *Fœnus erythrostomus*, Dahlbom.

Niger, sericeo-micans, tergo mesothoracis subtilissime coriaceo; mandibulis totis abdominisque medio ferrugineis, tibiis posticis albo-annulatis, oviductu fere abdominis longitudine, vaginis apice albis ♀.

Long. corp. lin. $4\frac{1}{2}$.

Habitat in West Gothia, Smolandia, et Ost Gothia, Dahlbom.

F. assectatori robustior, fere ut *jaculator*. Corpus nigrum, sericeo-micans, mandibulis totis ferrugineis vix summo apice nigricantibus; mesothorax tergo subtilissime coriaceus; abdominis segmenta 2dum et 3um tota, 4-tumque maculâ laterali ferrugineâ; oviductus $2\frac{1}{4}$ lin. et abdomen $2\frac{3}{4}$ lin. longitudine, terebra rufo-testacea, vaginis nigris, apice albis. Pictura pedum *F. assectatoris*.

Syn. *Fœnus erythrostomus*, Dahlbom, Exercitationes Entomologicæ, Pars vi. p. 78.

Obs. Individua nonnulla olim vidi in Musæo D. Ingpen, mense Julio, prope "Highgate" capta, oviductum fere quartam partem unciæ longitudine habentia. An hæc species?

Sp. 5. *Fœnus hastator*, Fabricius.

Rufus, antennis (articulo 1mo excepto) nigris, abdomine rufo, basi fasciâque fuscis; oviductu brevi nigro, pedibus rufis, tibiis posticis incrassatis atris.

Statura omnino *F. assectator*.

Habitat in Barbaria.

Nunc in Mus. Hafniæ.

Syn. *Fœnus hastator*, Fabr., Syst. Piez. p. 142.

Teste Cl. Erichsonii (qui notas plurimas collectionis Fabricianæ collegit mecumque illas benevole communicavit), descriptio Fabriciana abdominis vitiosa, coloris flavi nullis vestigiis apparentibus.

Sp. 6. *Fœnus Capensis*, Serville.

Species mihi ignota, a Guérino in "Iconographie du Règne Animal," Insectes, pl. 65, fig. 4, delineata. Descriptio ejus nondum edita.

Sp. 7. *Fœnus irritator*.

Hæc species, Americæ Septentrionalis incola, mihi etiam ignota, a Cl. Harrisio in Catalogo Insectorum Massachusettensium nomine tantum indicata.

Sp. 8. *Fœnus Guildingii*, Westw.

Gracilis, niger, thoracis et abdominis lateribus rufescentibus; oviductu fere corporis longitudine, vaginis et terebra apice albidis, tibiis et tarsis 4 anticis albis ♂ ♀.

Long. corp. (absque oviduct. ♀) lin. $5\frac{1}{2}$, oviduct. lin. 5, expans. alar. lin. 5.

Habitat in Insula St. Vincentii, D. Guilding.

In Mus. Dom. Hope.

Species valde elongata et attenuata; caput nigrum, albo-sericans; antennæ nigræ, apice piceæ aut rufæ; collum elongatum nigrum, lateribus sericantibus; pectus et latera meso- et metathoracis rufa, tergum nigrum punctatum; abdomen valde elongatum, piceo-nigrum, segmentis intermediis lateribus lutescenti-rufis; oviductus longitudine abdominis et thoracis piceus, apice albido; coxæ 4 anticæ rufæ, posticæ 2 nigræ; trochanteres et femora nigra; tibiæ et tarsi 4 antici albi, illis lineâ tenui internâ nigricanti et horum apice fusco; tibiæ posticæ nigræ, basi interne maculâ albâ; tarsi postici nigri, articulo basali in ♀ annulo albo; areola minuta discoidalis apice angustior, in ♀ triangularis.

Sp. 9. *Fœnus gracillimus*, Westw.

Tenuissimus, capite lævi, collo valde elongato, thoracis dorso punctato, antennarum articulo basali subtus, ore, pedibus 2 anticis, coxisque intermediis fulvis ; tibiis tarsisque 4 anticis albido-lineatis ; pedibus posticis omnino nigricantibus ; segmentis abdominalibus ad apicem fulvis.

Long. corp. lin. 6, expans. alar. lin. 6.

Habitat in Demerara.

In Mus. Brit. D. Latham.

Sp. 10. *Fœnus dorsalis*, Westw.

Ferrugineus, capite supra, medio mesonoti scutelloque nigris ; abdomine piceo, segmentis apice rufescentibus ; pedibus piceo-rufis, femoribus tibiisque 4 anticis in medio obscurioribus ♀.

Long. corp. lin. 5, expans. alar. lin. $4\frac{1}{2}$.

Habitat in Hispania. D. Latreille.

In Mus. Britann.

Ferrugineo-rufus, capitis vertice obscuro, facie sericeâ ; antennæ piceæ ; scutellum et medium mesonoti nigra ; metathorax ferrugineus ; abdomen longum, piceo-nigrum, segmentis apice rufescentibus ; pedes piceo-rufi, femora 4 antica in medio tibiæque anticæ picea ; oviductus segmento ultimo abdominis haud longior ; alæ parum fusco-tinctæ.

Sp. 11. *Fœnus terminalis*, Westw.

Niger, thorace lævi opaco, lateribus rufo-piceis ; tibiis 4 anticis albis, lineâ internâ nigrâ, posticis nigris clavatis, annulo basali albo ; tarsis albis, apice fuscis ; oviductu longitudine corporis, vaginis apice late albis ♂.

Long. corp. lin. (oviductu excluso) $9\frac{3}{4}$, expans. alar. lin. $10\frac{1}{2}$.

Habitat in Nova Hollandia et Terra Van Diemenii.

In Mus. Dom. Hope et Newman.

Species gracilis ; caput nigrum opacum, antice et postice albo-sericans ; antennæ nigræ ; mesothoracis tergum læve opacum ; latera thoracis versus tergum et tegulæ ferruginea ; pectus nigrum aut piceum, albo-sericans ; abdomen valde elongatum gracile, sensim incrassatum ; oviductus longitudine abdominis et thoracis ; terebra ferruginea, vaginis nigris apice latè albis ; coxæ 4 anticæ rufæ aut piceæ, femoribus rufis aut piceis, tibiis tarsisque albis, illis lineâ tenui internâ nigrâ, horum apice fusco ; femora 2 postica nigra ; tibiæ clavatæ nigræ, basi annulo albo ; tarsi albi, basi et extremo apice nigris ; alæ hyalinæ, stigmate nigro, areolâ discoidali parvâ apicem versus paullo

latiori. Variat capite antice, lateribus mesonoti, femoribus et parte infera abdominis rufo-piceis.

Sp. 12. *Fœnus australis*, Westw.

Piceo-niger punctatissimus, thorace varioloso, capite antice, thoracis abdominisque lateribus corporeque toto subtus picco-ferrugineis; antennis nigris, pedibus picco-ferrugineis, femoribus supra lineâ nigrâ notatis ♂.

Long. corp. lin. 7¼, exp. alar. lin. 9.

Habitat in Nova Hollandia.

In Mus. Westwood.

Syn. *Fœnus australis*, Westw., in Proc. Zool. Soc. April 14, 1835.

Mandibulæ elongatæ, similiter dentatæ (fig. 1 *z*), dente valido interno basali, dentibusque tribus parvis ante apicem positis; alæ vix coloratæ, apicibus nonnihil infuscatis; tarsi postici compressi, ad basin lati.

Sp. 13. *Fœnus unguiculatus*, Westw. (Pl. XV. fig. 1.)

Niger, rufo-picco varius, areolâ minutâ discoidali obliteratâ, unguibus tarsorum maximis (in pedibus posticis dimidium tarsorum longitudine æquantibus) ♂.

Long. corp. lin. 5½, expans. alar. lin. 8.

Habitat in Nova Hollandia?

In Mus. Dom. Hope.

F. australi affinis. Caput nigrum, subtilissime coriaceum, facie albo-sericanti; mandibulæ piceæ, dente magno truncato ante apicem alteroque magno acuto nigricanti versus basin, interne armatæ (fig. 1 *a*); antennæ piceo-nigræ, articulo 1mo basi et apice ferrugineo; mesothoracis tergum antice et ad latera et scutellum in medio nigra; latera thoracis piceo-rufa; abdomen brevius, sensim clavatum, piceum, basi nigrum, segmentorum marginibus magis rufescentibus; pedes piceo-rufi, coxis femoribusque supra obscurioribus, tibiis posticis parum clavatis, calcaribus elongatis; tarsi postici breviores compressi; ungues tarsorum quam in reliquis speciebus multo longiores, presertim in pedibus posticis, in quibus dimidium tarsorum longitudine fere æquant; alæ hyalinæ, areola parva discoidali obliterata, scil. areola 1ma submarginali cum illa effusa.

Sp. 14. *Fœnus Darwinii*, Westw.

Piceo-niger, rufo-varius, pedibus rufo-fulvis, areolâ discoidali magnâ ♂.

Long. corp. lin. 3, expans. alar. lin. 1¾.

Habitat in Nova Hollandia. Dom. Darwin.

Parvus, forma fere *F. unguiculati.*

Caput piceum, punctatum, margine oculorum et clypei mandibulisque rufescentibus, his apice nigris; antennæ piceæ, subtus pallidiores, articulo 1mo magis rufescenti; thorax brevis, rufus; tergum punctatum, maculâ magnâ anticâ, alterisque duabus lateralibus scutelloque in medio nigris; abdomen rufo-piceum, segmentis apice nigricantibus; pedes piceo-rufi, tarsis gracilibus obscurioribus, tarsis posticis articulis externe ad apicem acute productis; alæ hyalinæ, stigmate nigro, areolâ discoidali quam in congeneribus multo majori conicâ.

Sp. 15. *Fœnus rufus*, Westw.

Totus rufus, alis hyalinis ♂.

Long. corp. lin. $5\frac{1}{2}$, expans. alar. lin. $6\frac{3}{4}$.

Habitat in Australia occidentali. D. Gould.

In Mus. Hope.

F. australi etiam affinis. Totus rufus; caput et thorax punctata, spatio parvo antico mesothoracis transverse striolato; mandibulæ apice extremo piceæ; alæ hyalinæ, stigmate in medio lutescenti, areolâ discoidali magnitudine mediocri; thorax lateribus parum sericantibus.

Sp. 16. *Fœnus Senegalensis*, Blanch. Hist. Nat. Ins. vol. iv. p. 300.

Habitat in Senegallia.

In Mus. Reg. Paris.

Sp. 17. *Fœnus Brasiliensis*, Blanch. Hist. Nat. Ins. vol. iv. p. 300.

Habitat in Brasilia.

In Mus. Reg. Paris.

Aulacus, Jurine.

This genus, founded by Jurine, differs from *Fœnus*, in having the veins of the wings disposed in the ordinary manner, and in the slender hind legs and shorter abdomen, in which respects it assumes much of the ordinary appearance of some of the *Ichneumonidæ*. Like *Fœnus* it has the ovipositor long, and formed as in that genus, and the antennæ are composed of thirteen joints in the males (Pl. XIV. fig. 8*a*) and of fourteen in the females (fig. 8*b*). No figures of the *Trophi* having hitherto been published, I have added the details of the mouth of *A. Patrati*, taken from a male specimen; but as that was the sex dissected by Latreille * (vide

* In the details of the mouth of this genus, as well as of *Fœnus*, Esenbeck has relied upon Latreille's description, copying it almost verbatim without acknowledgment.

Gen. Crust. 4, 385), and as Jurine's figure of the mandible of *A. striatus* (taken from his unique female) differs in the toothing from my dissections and Latreille's description, I considered it probable that the difference might be sexual; having, however, also dissected a female of *A. ater* I find that its mandibles (fig. 9 *a*) are short, with a rather broad obtuse apical tooth, and three others smaller and more obtuse within. In the males of *A. Patrati* they are, as described by Latreille, "corneæ breves crassiusculæ, latere interno tridentato, dente apicali acutiore, paullo longiore, inferis duobus obtusis" (fig. 8 *d*); in one mandible however the apical tooth was furnished with a slight acute process within, like the rudiment of another tooth (fig. 8 *e*) The labrum (Pl. XIV. fig. 8 *c*), overlooked by Latreille and Esenbeck, is very minute and membranaceous, subtriangular, with the angles rounded and the sides rather emarginate. The maxillary palpi are 6-jointed (fig. 8 *f*), and the labial ones 4-jointed (fig. 8 *g*). The abdomen is implanted on the tergum of the metathorax, at a much greater distance from the scutellum than in *Fœnus*. The fore wings have one large marginal cell and three submarginal ones; the first of which generally receives the first recurrent vein, although in some species this vein extends to the place of union of the first transverso-cubital vein with the cubital one, so as in fact to become continuous with the first transverso-cubital. In *A. compressus* the first recurrent vein is inserted in the second submarginal cell. The first transverso-cubital vein is very oblique, the second is generally obliterated in the middle so as to give the appearance of the second submarginal cell being outwardly incomplete, this second submarginal cell receives the second recurrent vein, but at a short distance before its insertion the cubital vein itself is seen to be slightly angulated with a slight thickening at the angle, indicating, as it were, the obliteration of an intermediate transverso-cubital vein, which could extend to the upper extremity of the first of these transverse veins. The third submarginal cell extends to the extremity of the wing; the veins of the hind wing are almost obsolete. The legs are slender, the hind ones not incrassated, as in *Stephanus* and *Fœnus;* the ungues of the tarsi are acute at the tip, with two teeth within (fig. 7 *c*).

On reviewing the characters of this genus we find them agreeing with none of the *Ichneumones genuini*. With *Alysia*, however, they present a much nearer relationship, especially in the broad dentate mandibles (although the position of these organs at rest is quite different in the two genera), the labrum, maxillæ, labium, and palpi. With the exception of the second recurrent vein being

obsolete in *Alysia*, the veins of the wings of the two genera are nearly identical. The number of joints of the antennæ, and the mode of insertion of the abdomen, thus become almost the only material characters to separate this genus from some of the *Ichneumones adsciti;* indeed, Nees von Esenbeck introduces it into his family *Ichneumonides*, with the observation "locum inter *Sigalphum* et *Fœnum* jure meritoque tenet, utrique affinis;"* but in *Sigalphus* the mandibles have the characters of those of the genuine *Ichneumons*. The relationship of *Aulacus* to *Fœnus*, on the other hand, is far more strong, especially in the two family characters mentioned above, namely, the number of joints of the antennæ and the insertion of the abdomen, as well as in the exserted ovipositor and number of joints of the palpi. No figure of the male of this genus having been hitherto figured, I have added a representation of that sex of *A. Erichsonii*.

The following is a description of all the species of the genus with which I am acquainted:—

Sp. 1. *Aulacus striatus*, Jurine.

Niger, pedibus totis abdomineque rufis, coxis posticis petioloque nigris, capite lævi, antennis nigris, thoracis dorso transversim sulcato, alis hyalinis immaculatis, nervis et stigmate fuscis ♀.

Long. corp. lin. $3\frac{3}{4}$ (in fig. Jurin.).

Habitat in Helvetiæ Montosis, Jur., etiam in Lapponia, prope Caput Boreale, Esenbeck.

Syn. *Aulacus striatus*, Jur. Hym. p. 90, pl. 7, G. 3; Esenbeck, Insecta Lapponica, p. 407; nec Latr. Gen. Cr. et Ins. iv. p. 336.

In Mus. Berol. vidi.

Variat, secundum D. Servilleum, ore margineque antico et postico oculorum testaceis.

Sp. 2. *Aulacus gloriator*.

Ater, abdomine medio pedibusque rufis, coxis trochanteribusque nigris, tibiis 2 posticis fuscis, tarsis flavidis, alis maculâ stigmaticali apiceque fuscis.

Long. corp. lin. $5\frac{1}{2}$.

Habitat prope Viennam, N. ab Esenb. Gartz. Pomerania, Mus. Berol.

In Mus. Univers. Bonnæ et Reg. Berol.

* Insecta Lapponica, p. 408.

Syn. *Bassus gloriator*, Fab. Syst. Piez. p. 99 (teste Erichson, MSS. in Mus. Berol).
Aulacus flagellatus, Dahl. N. ab Esenb. Hym. Mon. 1, 305.

In individuo Neesiano petiolus abdominis manifeste brevior est quam in *A. Patrati*, et alæ flavido (præsertim ad costam) tinctæ, striolæ etiam mesothoracis dorsi minus profundæ et numerosiores.

Sp. 3. *Aulacus Patrati*, Serville.

Niger, abdomine medio pedibusque rufis, femoribus omnibus tibiisque posticis (basi et apice exceptis) nigro-fuscis, geniculis rufis, antennis nigris; capite lævi; alis hyalinis, stigmate et maculâ a stigmate descendenti fasciam abbreviatam constituente, fuscis, thorace reticulato rugoso.

Long. corp. ♀ (absque terebra) lin. 5 (Serville), lin. $5\frac{1}{4}$ (Esenbeck), lin. $4\frac{1}{4}$ (indiv. nostr.); $4\frac{3}{4}$ ♂.

Habitat in Europa Media.

Syn. *Aulacus Patrati*, Serville, in Ann. Soc. Ent. de France, 1833, p. 412, tab. 15, fig. c; Esenb. Hym. Monogr. Suppl. vol. i. p. 320.
Aulacus Latreillcanus, Nees ab Esenb., Hym. Ichn. Affin. Monogr. vol. i. p. 304, 1834.
Aulacus striatus, Latr., Gen. Cr. et Ins. iv. p. 386; Serville and St. Farg., Encycl. Méth. x. p. 31, cum præcedenti confusus.
Aulacus sagittator, Pallas, MSS. in Mus. Berol.

" In pinetis Vasconiæ," Latreille. " Environs de Tours," Serville. " Prope Sickershausen," Nees ab Esenbeck.

♀ in Mus. Westwood. D. Klug communic.

Obs. In individuis Neesiano et Servilliano, vena prima recurrens in aream 1am submarginalem ascendit spatio brevi ante initium areæ 2dæ submarginalis. In individuis Latreilleo descriptis, ut et in nostris utriusque sexus, vena prima recurrens ad angulum lateris inferi et secundæ areæ submarginalis initium ascendit. Confer etiam observationes sub *Aulacum comprcssum*.

Sp. 4. *Aulacus obscuripennis*, Westw., ♀.

Niger, capite lævissimo, thorace antice irregulariter transverse striato, postice rugoso, abdomine medio rufo; alis hyalinis,

nubilâ parvâ mediâ, fasciâ substigmaticali apiceque tenui fuscis.

Long. corp. lin. $5\frac{3}{4}$ (absque terebra), expans. alar. lin. $9\frac{1}{2}$.

Habitat in Polonia (Waga).

In Mus. Reg. Berol.

Præcedentibus major.

Coxæ et femora nigra, genieulis rufis; tibiæ et tarsi 4 antici rufi, tibiæ posticæ nigræ, basi et apice rufæ; tarsi rufi. An *Aulaco Patrati* vere distinctus?

Sp. 5. *Aulacus Erichsonii*, Westw. (Pl. XIV. fig. 6.)

Gracilis, niger, antennarum articulo 1mo subtus fulvo, abdominis dimidio basali (petiolo nigro) rufo, fasciâ tenui transversâ nigrâ, apice nigro; coxis nigris, pedibus 4 anticis flavido-rufescentibus, femoribus 2 posticis fuscis, tibiis obscuris, apice rufescentibus, tarsis omnibus albidis, alis nubilâ substigmaticali apiceque parum fuscis ♂.

Long. corp. lin. $5\frac{1}{2}$, expans. alar. lin. 9.

Habitat prope Berolinum, D. Erichson.

In Mus. Reg. Berol.

Sp. 6. *Aulacus compressus*, Spinola.

Niger, abdomine medio rufo, alis immaculatis, stigmate venisque nigris, mandibulis 3-dentatis, pedibus nigris, tibiis tarsisque anticis piceis ♂.

Long. corp. lin. 8.

Habitat in Montibus Orerii (Liguria) Spinola.

Specimen unicum a Spinola capta. Latreillius autem dicit "*Aulacum compressum* forsan præcedentis [*Aul. striati* seu *Aul. Patrati*, Serv., *Aul. Latreilleani*, Esenb.] varietatem a Dom. Spinola accepi. Alæ *Aulaci compressi* simili modo reticulatæ," ut in individuis suis *Aul. Patrati* (*striati*, Latr.). De hac re Neesius inquit, "nostrum non est has lites dirimere, cum *Aul. compressum*, Spin., videre non contigerit, forsan duarum hic commiscentur specierum individua, sed quoniam vir acutissimus *Aulaco compresso* disertis verbis tribuit nervas recurrentes duos mediam areolam cubitalem petentes et alas immaculatas esse perhibet donec res accuratius illustretur speciei propriæ esse hunc *Aulacum* a cl. Spinola inventa non dubitamus." Contra sententiam Latreillii magnitudo insecti, color pedum et alæ immaculatæ insuper speciem distinctam indicant.

Sp. 7. *Aulacus thoracicus*, Klug, MSS.

Niger, collari et mesothoracis dorso sanguineo, striato, alis costâ areolâ marginali et 1mâ submarginali fuscis ♂ ♀.

Long. corp. lin. 5, expans. alar. lin. 9.

Habitat apud Promont. Bonæ Spei, Krebs.

In Mus. Reg. Berol. et nostr.

Oviductus ♀ brevior; scutellum ♂ nigrum, ♀ rufum; tarsi 2 postici ♀ articulo basali albo.

Sp. 8. *Aulacus Stephanoides*, Westw.

Niger, capite et antennarum articulo basali luteis, abdomine elongato gracili, oviductu abdomine duplo longiori, terebra rufa, vaginis nigris apice albis, alis apice parum fuscis ♀.

Long. corp. lin. 7, oviduct. lin. 11, expans. alar. lin. 11.

Habitat in Brasilia, Virmond.

In Mus. Reg. Berol.

Alæ hyalinæ, stigmate nigro, venâ 2dâ transverso-cubitali perfectâ et fere rectâ; mesothorax antice bilobatus.

Sp. 9. *Aulacus hyalinipennis*, Westw.

Niger, facie et articulo 1mo antennarum fulvis, alis hyalinis, stigmate nigro apice fusco, pedibus 4 anticis fulvis, femoribus posticis fuscis, tibiis rufescentibus, tarsis fulvis ♂.

Long. corp. lin. 5, expans. alar. lin. 6.

Habitat Mexico.

In Mus. Reg. Berol.

Species gracillima; caput parvum, facie et partibus infera et postica fulvis; antennæ nigræ, articulo basali fulvo; collum elongatum nigrum, subtus fulvum; thorax et abdomen nigra, hoc compresso; alæ valde hyalinæ, apice fusco, stigmate nigro; pedes postici coxis et femoribus fuscis, geniculis fulvis, tibiis rufescentibus, tarsis fulvis, apice fuscis; palpi fusci.

Sp. 10. *Aulacus ater*, Westw.

Totus ater, alis pallidè fuscescentibus, areolâ externo-mediâ plagâ parvâ posticâ, alterâque minutâ cum stigmate connexâ fuscis ♀.

Long. corp. lin. 7, expans. alar. lin. $11\frac{1}{2}$.

Habitat in Nova Scotia.

In Mus. Reg. Berol. et nostr.

Syn. *Aulacus niger*, Shuckard, in Entomologist, p. 124.

Caput et thorax pubescentia grisea parum induta; oviductus corpore fere longitudine æqualis; terebra picea; mesothorax transverse striatus; alæ fuscescenti hyalinæ, apice parum obscuriores, stigmate nigro; striga minuta in parte postica areolæ externo-mediæ et macula parva sub stigma apicem areolæ 1mæ submarginalis occupante.

A variety of this species, with a red fascia across the middle of the abdomen, is figured amongst Abbott's drawings in the British Museum, vol. xii. fig. 18.

Sp. 11. *Aulacus? fasciatus*, Say.

Alis violaceis, fasciâ mediâ hyalinâ.

Long. corp. lin. 6.

Habitat ad Ohium fluvium, Amer. Septentr.

Syn. *Aulacus fasciatus*, Say., Contrib. of the Maclurian Lyceum, 1, p. 69, Jan. 1829; Serville, Ann. Soc. Ent. France, 1833, p. 412; Nees ab Esenb. Hym. Mon. 1, p. 320.

Sp. 12. *Aulacus Abbottii*, Westw.

Niger, abdomine versus basin rufo; pedibus rufis, alis strigâ parvâ versus basin maculâque pone stigmata fuscis ♀.

Long. corp. lin. 7, oviduct. lin. 8, expans. alar. lin. 11.

Habitat in Georgia Americæ.

In Mus. Britann.

Caput tenuissimè punctatum, pubescentia grisea parum indutum; palpi et antennæ nigri; mesothorax transverse striatus, striis anticis magis distantibus; abdomen nigrum, segmenti 1mi apice et 2do (apice excepto) rufis; terebra rufa, vaginis nigris apice piceis; pedes rufi, coxis nigris, trochanteribus posticis fuscis, alis pallidè flavido-hyalinis, striga tenui versus basin apiceque areolæ 1mæ submarginalis fusco, stigmate nigro.

Sp. 13. *Aulacus rufus*, Westw.

Rufus, antennis (basi excepto) et abdominis basi nigris, alarum apice fusco.

Long. corp. lin. 8, expans. alar. lin. 14.

Habitat in Terra Van Diemenii.

In Mus. Hope.

Caput nitidum; mandibulæ apice nigræ; antennæ nigræ, articulis duobus basalibus rufis, 3tio piceo; thorax transverse striatus,

lobis lateralibus et anticis valde distinctis; petiolus abdominis elongatus, niger, nitidus; terebra rufa, vaginis nigris; alæ hyalinæ, apice fusco-tinctæ, stigmate nigro, areolâ costali, apice fusco.

Sp. 14. *Aulacus cingulatus*, Westw.

Rufus, antennis piceis, articulo 7mo albo ♀.
Long. corp. lin. $5\frac{3}{4}$, expans. alar. lin. 11.
Habitat apud Fluvium Cygnorum, Nov. Holl.
In Mus. Hope.

Caput rufum, lævе; mandibulæ apice nigræ; antennæ piceæ, articulis basalibus rufis, 7mo albo, reliquis magis nigricantibus; thorax rufus transverse striatus, tegulis albidis, lobis anticis mesonoti valde elevatis; abdomen ovatum petioli brevi, rufum nitidum, basi supra nigrum; pedes rufi, tibiis 2 posticis in medio piceis; oviductus abdomine fere triplo longior; terebra rufa, vaginis nigris; alæ valde hyalinæ, iridescentes, stigmate et venis nigris, nubilâque minutâ apicali fuscâ.

Sp. 15. *Aulacus lateritius.*

Lateritius: abdominis et alarum basi, antennarum apice nigris articulisque 7 et 8 flavo-albidis, alisque ad apicem maculâ parvâ fuscâ, tibiis tarsisque posticis extus fuscis.
Syn. *A. lateritius*, Shuckard, in Entomologist, p. 125.
Long. corp. lin. $8\frac{1}{2}$, expans. alar. lin. 16.
Habitat in Nova Hollandia.

Sp. 16. *Aulaeus congener*, Westw.

Rufus, abdomine nigro, antennis, tibiis, tarsisque obscure picco-rufis; alis pallidis, fere dimidio basali, areâ anali nubilâque apicali fuscis, costâ crassâ, stigmateque angustiori nigris ♂.
Habitat —— ?
Long. corp. lin. 9, expans. alar. lin. $12\frac{1}{2}$.
In Mus. Britann.

Sp. 17. *Aulacus apicalis*, Westw. (Pl. XIV. fig. 7.)

Rufus, capite abdomineque nigris, hoc lunulâ versus basin flavescenti, alarum apice lato nigro ♀.
Long. corp. lin. 5, expans. alar. lin. $10\frac{1}{2}$.
Habitat in Nova Hollandia.
In Mus. Dom. Hope and Shuckard.
Syn. *Aulacus variegatus*, Shuckard, in Entomologist, p. 125.

Species insignis, brevis; caput nigrum, nitidum; antennæ breves, crassiores, nigræ, articulis duobus basalibus rufis, 10—14 albis (dimidio apicali ultimi nigro excepto); thorax rufus, striatus, lobis anticis mesothoracis valde elevatis; pedes rufi, tarsorum articulo ultimo fusco; alæ hyalinæ stigmate apiceque lato nigris; abdomen breve, ovatum, petiolo brevi, nigrum, nitidum, lunulâ versus basin flavescenti; oviductus abdomine vix dimidio longior, fere erecta (fig. 7 *a*); terebra rufa, vaginis nigris. Fig. 7 *b*, caput et prothorax, ex latere visa; 7 *b*, ungues.

Sp. 18. *Aulacus signatus.*

" Niger, scapo antennarum pedibusque 4 anticis rufo-testaceis; " alis hyalinis, maculâ ad stigma brunneâ." Shuckard in Entomologist, p. 124.

Long. 5½ lin., exp. alar. 9½ lin.

Habitat Ceylon.

In Mus. Shk.

On comparing the characters of the preceding genera together we find that in effect they present but little uniformity, inter se, if we except the number of joints of the antennæ and the unusual place of insertion of the abdomen.

The upper lip of *Fœnus* and *Evania* is nearly alike, but those of *Pelecinus* and *Aulacus* materially differ from the preceding, as well as from each other; the mandibles offer a better character in their very strong, broad and dentate form, but those of *Pelecinus* resemble those of the majority of the *Ichneumonidæ*. The maxillary palpi, although generally 6-jointed and the labial 4-jointed, are respectively only 5- and 3-jointed in *Pelecinus*. The veining of the fore wings offers no uniformity, except in the presence in all of a distinct costal cell, by which they are separated from all the *Ichneumonidæ*, in which the cell is obliterated by the union of the postcostal vein with the costa. Moreover, in the hind wings the veins are almost obsolete in all the genera yet reviewed. The form of abdomen, the length of the ovipositor, and the form of the feet, afford no uniform characters; neither is the toothing of the ungues constant, being simple in *Fœnus* and *Pelecinus*.

There are, however, several other genera which are so closely allied to the preceding groups that I consider myself authorised in regarding them as equally belonging to the family.

MEGALYRA, Westw.

Corpus cylindricum, fere parallelum. *Caput* thoracis latitudine fere globosum (Pl. XV. fig. 3*a*, caput ♂, ex latere visum; fig. 3*b*, facies ♂; fig. 3*e*, caput et thorax ♀). *Ocelli* inter oculos positi; antennæ versus os (sub carinam semicircularem clypeum cingentem) insertæ. *Labrum* breve, triangulare, setosum. *Mandibulæ* breves, crassæ, corneæ, apice acutæ, dentibusque duobus internis æqualibus intus apicem armatæ. *Maxillæ* lobis duobis apicalibus margine membranaceo. *Palpi* maxillares 5-articulati; 1mo brevissimo, 2do et 3tio brevibus, obconicis; 4to et 5to longis, gracilibus. *Mentum* angustum, corneum, semitubulosum. *Labium* membranaceum, ovatum. *Palpi* labiales articulis 3us fere æqualibus (fig. 3*f*, maxilla et labium in situ). *Antennæ* gracillimæ, in utroque sexu 14-articulatæ. *Prothorax* minutus, in collum haud productum. *Mesothorax* margine antico truncato et ad marginem posticum capitis applicato. *Mesoscutum* fere quadratum. *Scutellum* magnum. *Metathorax* parte anticâ thoracis vix angustior, apice truncatus, lineâ mediâ in duas partes divisus. *Abdomen* subsessile (petiolo nullo) in apicem metathoracis insertum, oblongo-ovatum (fig. 3*d* ♂), fere thoracis latitudine. *Oviductus* longissimus (fig. 3*g*, apex abdominis ♀ infra; 3*h*, lateraliter visus; 3*k*, apex terebræ lateraliter; 3*l*, supra visus). *Alæ* anticæ venâ postcostali e costa remotâ, stigmate inconspicuo, areolâ unâ marginali, duabus submarginalibus, venâ transversâ has separantibus indistinctâ (venis longitudinalibus in parte colorata multo crassioribus (fig. 3*i*); venâ unicâ obliquâ in alis posticis). *Pedes* longitudine mediocres, femoribus parum crassioribus, tibiis tarsisque simplicibus, illis apice ecalcaratis in pedibus 4 posticis; his articulo 4to subtus setoso (fig. 3*m*). *Ungues* simplices, pulvillus parvus.

In this genus we have a still greater departure from the assigned character of the family, the abdomen being implanted upon the thorax in the ordinary position. We find, however, the broad toothed mandibles, the 14-jointed antennæ, the distinct costal cell of the fore wings, and the indistinct veining of the hind wings, which we have seen to be the predominating characteristics of the family, whilst the number of the articulations of the palpi correspond with those of *Pelecinus*.

The only known species of this curious genus is an inhabitant of New Holland.*

* [P.S. Mr. Shuckard now possesses a second and larger species of the genus from the same country.]

Megalyra fasciipennis, Westw. (Pl. XV. fig. 3 ♂.)

Nigra, pedibus rufis, alis fasciatis, capite thoraceque punctatis.

Long. corp. lin. 5—7½ (oviduct. exclus.), expans. alar. lin. 9—12½, long. oviduct. individ. majoribus lin. 28.

Habitat in Nova Hollandia.

In Mus. nostr. &c.

Syn. *Megalyra fasciipennis*, Westw., in Griffith An. Kingdom, pt. 33, p. 419, Insects, pl. 66, fig. 4 ♀, pl. 106, fig. 4*a-f*, details.

Antennæ nigræ, basi piceæ, articulo 1mo crasso, 2do minuto reliquis gracillimis, 4to longiori; articulis 3—5 interdum piceo-rufis; caput et thorax confertissime punctata, griseo-pubescentia; abdomen in utroque sexu dorso 7-annulato, segmentis duobus basalibus margineque postico segmentorum sequentium in fœmina nitidis, horum basi tenuissime et confertissime puntatissimis, lateribus griseo-pubescentibus; abdomen maris segmento 1mo nitido, punctis nonnullis sparsis, 2do et 3tio punctatissimis, spatio brevissimo medio transverso impunctato, 4to et 5to basi lævibus apice punctatissimis, 6to et 7mo parcius punctatis, hujus apice acuto; oviductûs terebra rufo-picea, vaginis nigris; pedes rufi aut piceo-rufi; alæ fuscescenti-hyalinæ, fasciâ latâ fuscâ pone medium anticarum apiceque nubila fuscescenti, venis in parte colorata alarum nigris, reliquis piceo-rufis.

A figure of the female of this insect having been published in "Griffith's Animal Kingdom," the male is here represented; the female differing from that sex only in possessing an exceedingly long exserted ovipositor.

Trigonalys, Westw.

(Proceedings of Zool. Soc., April 14, 1835, No. 28, p. 53.)

Genus anomalum. Caput et antennæ *Lydæ*, abdomen *Mutillæ*, alarum venæ fere ut in *Myrmosa* dispositæ. *Caput* magnum, subquadratum, planum, antice paullo latius. *Clypeus* margine antico emarginato. *Labrum* minimum, apice attenuatum, linguiforme, longe ciliatum, è membrana lata prodeuns (Pl. XV. fig. 4*a*). *Mandibulæ* (fig. 4*b*, 4*c*) magnæ, crassæ, apice acutissimæ, uno dentibus duobus, altero vero tribus magnis acutis internis. *Maxillæ* (fig. 4*d*) parvæ, lobo apicali membranaceo, rotundato, lobo interno minuto. *Palpi* maxillares 6-articulati, articulis longitudine inæqualibus; 1mo minuto, 3tio brevi crassiori. *Mentum* corneum, semitubulosum.

Labium (fig. 4*e*) parvum, membranaceum, lobis duobus obtusis lateralibus membranaceis. *Palpi* labiales 3-articulati; 1mo longiori, 2do brevi obconico, 3to multo majori, securiformi, setoso. *Antennæ* (fig. 4*f*) inter oculos in medio faciei insertæ, capite cum thorace longitudine fere æquales, 25-articulatæ; articulo 1mo crasso, 2do parvo, 3tio primi longitudine, reliquis longitudine sensim decrescentibus, apicalibus minutissimis et gracilibus. *Collum* breve. *Thorax* ovato-obconicus; mesothoracis tergo latiori, parapsidibus distinctis. *Abdomen* in parte infera apicali metathoracis insertum (fig. 4*i*), convexum, ovatum, antice et postice paullo attenuatum, apice deflexo, petiolo nullo, tergo 5-annulato; ventre etiam 5-annulato, ano etiam apparente. *Alæ* anticæ formæ et magnitudinis ordinariæ; anticæ longitudine thoracis et abdominis; vena postcostali e costa remota, stigma mediocre, cellula una marginali, 4 submarginalibus; 1ma magna, apice acuminata, (vena prima recurrenti cum venâ 1mâ transverso-cubitali continuâ,) 2da parva, elongato-triangulari, 3tia parva quadrata venam secundam excipienti, 4ta apicem alæ attingente. *Alæ* posticæ venis distinctis. *Pedes* graciles, longitudine mediocres; trochanteres biarticulati (fig. 4*g*), in pedibus anticis longi. *Tibiæ* 4 posticæ apice bicalcaratæ. *Tarsi* graciles, unguibus apice bifidis (fig. 4*h*).

This extraordinary genus exhibits so many discordant characters that its real affinities must remain at present undetermined. Were the antennæ broken off it would at first sight be regarded as a male *Mutillæ*, of which it has completely the habit, whilst the veining of the fore wings is very similar to that of *Myrmosa*; in fact, in this character, both in the fore and hind wings, we have a complete fossorial insect, none of the *Pupivora* exhibiting so perfect a development of the veins of the wings, especially of the hind pair. The form of labrum exhibited by this insect is found also in *Vespa*, as well as in *Sapyga*, which last genus also strikingly agrees with *Trigonalys* in the form of the mandibles, and also nearly in the veins of both fore and hind wings. With such characters we might almost be justified in regarding the insect as belonging to the *Aculeata*, and as an anomalous form of the *Mutillidæ*, or *Sapygidæ*, more especially as we know that in the clavate antennæ of *Sapyga*, and the flabellate ones of *Psammotherma*, the antennæ of that family are liable to anomalous modifications of form, whilst many *Coleoptera* teach us that an increased

number in the joints of the antennæ is one of the most ordinary of the anomalies which those organs exhibit.

On more minutely examining the insect we find, however, that an equally strong relation with the *Pupivora* is possessed by it, founded upon other characters, in addition to that of the antennæ, which in their multi-articulate structure are represented by those of various *Tenthredinidæ*, and more especially by the *Ichneumonidæ*.

The structure of the trochanters, and the irregularity in the number of the joints of the palpi, (6 and 3 instead of 6 and 4,) joined to the number of segments in the abdomen, of which there are only 5 (instead of 6 or 7, as in the sexes of the aculeate *Hymenoptera*), are reasons which appear sufficient to warrant us in placing the genus amongst the aberrant *Hymenoptera*, amongst which we will now inquire its place.

The nonsessile abdomen at once removes the genus from the *Tenthredinidæ*, whilst the veining of the wings, the comparative fewness of the joints of the antennæ, and the 6-jointed maxillary palpi, remove it from the *Ichneumones genuini*. We must therefore refer it either to the adscitous *Ichneumonidæ* or to the *Evaniidæ*, which are the only other families to which it can be considered as allied. It is amongst the *Alysiides*, and especially in *Alysia*, that we find the most complete veining of the wings united with very strong and dentate mandibles, and 6-jointed maxillary palpi; but no adscitous *Ichneumon* possesses two recurrent veins, nor has the costal areolet distinct. Now these two characters, which with the broad toothed mandibles we have found to be so characteristic of the *Evaniidæ*, are found in this genus; moreover, in *Evania* we have the minute labrum, strong toothed mandibles, 6-jointed maxillary palpi, irregular shaped labial palpi, bifid ungues, and elongated anterior trochanters of *Trigonalys*. *Fœnus* also presents us with the minute labrum, strongly toothed mandibles, and 6-jointed palpi; whilst by minutely examining the direction of the cubital vein of *Aulacus* we find evidence of the obsolete existence of a transverse cubital vein, which, were it present, would render the fore wings of the two genera absolutely identical, although the hind wings are, it is true, very differently veined; nevertheless, if the veins be traced, they will be found nearly to correspond with those of the hind wing of *Trigonalys*.

We thus learn that the fewness of the joints of the antennæ, as well as the mode of insertion of the abdomen, are no longer characteristic of the group or family typified by *Evania*.

The genus is named in allusion to the triangular form of the

second submarginal cell, which is sometimes petiolated. The recurrent veins also vary somewhat in the place of their connection with the submarginal cells, sometimes being separate from, and sometimes inosculating with, the veins which separate these cells.

Sp. 1. *Trigonalys melanoleuca*, Westw. (Pl. XV. fig. 4.)

Nigra punctata, subpubescens, capite antice, et pone oculos maculisque duabus minutis verticis, metathoracis lunulis duabus segmentoque 1mo abdominis albis, alis pone medium fuscis.

Long. corp. lin. 4, expans. alar. lin. 7.

Habitat in America Meridionali. Bahia.

In Mus. Britann. et Westwood. Communic. Dom. Turner.

Caput et abdomen nitida, thorax obscurus, totum corpus griseo-pubescens; metathorax albus, in medio linea tenui nigra, postice subito dilatata; abdomen punctatum, segmento 1mo nitido, segmentis 2—5 lateribus albo-maculatis; pedes nigri, griseo-villosi, coxis, trochanteribus femoribusque albo-variis; alæ hyalinæ, dimidio apicali fusco, versus angulum analem pallidiori.

Sp. 2. *Trigonalys Servillei*, Westw.

Nigra, parte postica thoracis et abdominis basi pallidè luteis, alis immaculatis hyalinis.

An *Cælius* Servillei, Lepell. de St. Farg. Guér. Rev. Zool. 1842, p. 84? Magnitudo *Tr. melanoleucæ*.

In Mus. Dom. Serville, Parisiis. An varietas præcedentis?

Sp. 3. *Trigonalys obscura*, Westw.

Nigra obscura, capite plano nitido, abdomine segmento 1mo margine postico luteo, alis obscurè fuscis.

Long. corp. lin. 7, expans. alar. lin. 13.

Habitat in Surinamia. Cordua.

In Mus. Reg. Berol.

Syn. *Sphex depressa*, De Geer Mem. vol. 3, pl. 30, fig. 7, teste Dom. Erichson.

Antennæ et pedes nigri fusco-sericantes, tibiis tarsisque apice fuscis; abdomen fusco-pubescens, segmento 1mo ad apicem obscure luteo, subtus omnino luteo; alæ anticæ obscure fuscæ, versus angulum analem magis hyalinæ, vena penultima transverso-cubitali intus ramum parvum, apice fuscatum, emittit.

Sp. 4. *Trigonalys Leprieurii*, (Seminota Lepr. Guér. Mag. Zool. 1840, pl. 41.)

Habitat Cayenne.

Sp. 5. *Trigonalys Hahnii*, Spinola.

Omnino nigra, alis anticis fasciâ obscurâ.
Magnitudo præcedentis, sed gracilior et pedibus longioribus.
Habitat in Germania, Gallia et Anglia.
In Mus. Dom. Serville, Guérin, Spinola, Shuckard.
Syn. *Trigonalys Hahnii*, Spinola, in Guér. Mag. Zool. Ins. 1840, pl. 50.
Trigonalys nigra, Westw., in hoc op. olim.
Trigonalys Anglicana, Shuckard, in Entomologist, p. 122.
Abastus Macquartii, Lepell. de St. Farg. ined.

Sp. 6. *Trigonalys pullata*.*

Syn. *Lycogaster pullatus*, Shuckard, in Entomologist, p. 124.

Stephanus, Jurine.

This is another anomalous genus whose true situation has equally perplexed systematists: Jurine, the founder of it, placing it with the *Evaniidæ* on account of its relation with *Fœnus*, " soit par la manière de tenir son abdomen presque verticalement, soit par le reuflement de ses jambes postérieures." Latreille, on the other hand, placed it with *Xorides*, at the head of the genuine *Ichneumons*, regarding it and *Aulacus* as the connecting links between them and the *Evaniidæ*, observing " *Stephani* antennis et abdominis insertione cum *Ichneumonidibus* omnino conveniunt, et ad tertium ordinem methodi Jurineanæ potius quam ad secundum [scil. *Evaniidæ*] cui inscribuntur, pertinent."—(Gen. Crust. 4, p. 4.) It is chiefly on account of the number of joints in the palpi described by Latreille, and all subsequent authors who have treated upon the genus, (namely, five in the maxillary, and four in the labial,) that this relationship with the genuine *Ichneumons* has been founded; but in *Stephanus Brasiliensis*, which I have very carefully examined, the maxillary palpi are unquestionably 6-jointed; which characters, as well as the recurrent vein, at once removes the genus from the genuine *Ichneumons:* indeed, Esenbeck, and Messrs. Serville and St. Fargeau, influenced by other con-

* I consider *Lycogaster pullatus*, Shuckard, to be the male of another species of *Trigonalys*.

siderations, removed *Stephanus* to the *Adsciti*, the latter authors observing " Le genre *Stephane* doit constituer à lui seul une subdivision dans les *Braconides* avec ce caractère, palpes maxillaires de 5 articles, les labiaux de quatre "—(Encycl. Méth. 10, p. 488); whilst Esenbeck regards *Stephanus* as the connecting link with *Alomya*, between the *Braconoidei* and the *Ichneumones genuini*.—(Hym. Monogr. 1, p. 6.) Lastly, Mr. Haliday, in his " Hymenopterorum Synopsis," has formed *Stephanus* into a family distinct from the great family *Ichneumonidæ*, with the character " Prothoracis collum elongatum ?" between *Agriotypus* and the *Evaniadæ* characterized " abdomen metathoracis dorso annexum."

In *S. Brasiliensis** the labrum, which does not appear to have been previously described, is small, transverse-quadrate, with the anterior angles rounded, and setose; the mandibles are nearly triangular, with a very slight tooth on the inside near the tip; the maxillary palpi are distinctly 6-jointed, and the labial 4-jointed; the antennæ have between thirty and forty joints; the tergum of the prothorax is strongly developed, and extends at the sides to the squamulæ; in front it is suddenly contracted and formed into a distinct neck transversely striated; the metathorax is as long as the mesothorax. The veining of the fore wings is almost identical with that of such of the *Alysiides* as have only two submarginal cells; the postcostal vein is not confluent with the costa; the hind wings offer only two distinct longitudinal veins. The remarkable structure of the tarsi has not been before noticed, these parts in the four fore legs are very slender and long, but much shorter and thicker in the hind legs, especially of the females. In all the feet, however, the fourth joint is produced into a long lobe beneath, having the fifth joint inserted quite at its base, so as to cause the fourth joint from above to appear scarcely distinct. The tarsal ungues are entire. The abdomen of the female is represented at Pl. XV. fig. 5.

On reviewing the characters of the genus, it appears to me that, notwithstanding the extended limits assigned to the family, *Stephanus* ought not to be considered as belonging to it, but must be placed amongst the *Ichneumones adsciti* near *Alysia*, (instead of *Bracon*, Esenbeck's insertion of it amongst the *Braconoidei* being founded on his erroneous character of the maxillary palpi,) from all which however it is absolutely isolated. In fact, the distinct costal cell, and the slight veining of the hind wings, seem to be

* The details of the mouth of this species are figured in the " Animal Kingdom," Insects, pl. 106, fig. 2*a*—2*h*.

the only characters amongst those which we have seen to be constant amongst the *Evaniidæ*, which would unite *Stephanus* with that family, although several of its other characters accord with those of *Pelecinus* and *Fœnus*.

Sp. 1. *Stephanus serrator.*

Brecon serrator, Fab., Ent. Syst. Suppl. 224; Syst. Piez. p. 108.
Stephanus coronatus, Jurine.
Habitat in Europa.

Sp. 2. *Stephanus coronator.*

Pimpla coronator, Fab., Syst. Piez. p. 118; Serville and St. Fargeau, Enc. Méth. 10, 489.
Habitat in Amboina (Fabricius); Java (Serville and St. Fargeau, in Enc. Méth.).

Sp. 3. *Stephanus frontalis*, Klug., MSS.

Species adhuc inedita, in Mus. Reg. Berolinensi conserv.
Habitat Caput Bonæ Spei.

Sp. 4. *Stephanus Brasiliensis*, Westw.

Westwood, in Griffith, An. Kingdom, Insects, pl. 66, fig. 3, ♂ pl. 106, fig. 2 *a-h*, details.
Habitat in Brasilia.

Sp. 5. *Stephanus furcatus*, Serv. and St. Farg.

Serville and St. Fargeau, Enc. Méth. 10, 489; Guérin, Icon. R. An. Ins. pl. 65, fig. 5 ♀, and 5 *a b*, details.
Habitat in Brasilia.

Sp. 6. *Stephanus acutus*, Serv. and St. Farg.

Serville and St. Fargeau, Enc. Méth. 10, 489.
Habitat in Brasilia.

Sp. 7. *Stephanus bicolor*, Westw.

Piceo-niger, capite thoraceque rufis rugosis, oviductu fasciâ latâ albâ ante apicem ♀.
Long. corp. (oviduct. exclus.) lin. 9½, expans. alar. lin. 10.
Habitat in Georgia, Americæ.
In Mus. Soc. Linn. Lond. Dom. W. E. Hooker.

Caput ferrugineum punctatum, postice lineis transversis brevibus elevatis in medio notatum, hæ lineæ in verticem sunt magis curvatæ, fronte tuberculis nonnullis acutis, alteroque in medio faciei inter oculos et sub ocellum intermedium posito; antennæ et palpi picei; thorax ferrugineus, transverso-striatus; metathorax obscurior et rude punctatus; abdomen piceum, petiolo longitudine mediocri; oviductûs valvulæ nigræ, fasciâ latâ albâ ante apicem; pedes 4 antici picei, tarsis paullo pallidioribus, pedes postici valde robusti et breves, tarsis posticis brevissimis crassis et ferrugineis, articulo basali maximo; alæ fusco-luteo tinctæ, venis distinctis stigmateque nigris.

This species is apparently figured amongst Abbot's drawings in the British Museum, vol. 12, fig. 19.

Sp.? 8. *Stephanus diadema.*

Fœnus diadema, Fabricius, MSS., in Mus. Kiliæ.

I am unfortunately unable to determine whether this undescribed insect be specifically different from the last; the notes which I made at Kiel simply stating that the *Fœnus diadema* of the Fabrician Cabinet is a *Stephanus* with a red head.

Sp. 9. *Stephanus Indicus*, Westw.

Niger, gracillimus, antennarum basi rufo, tibiis tarsisque basi albidis, petiolo longissimo, venis discoidalibus obsoletis ♂.

Long. corp. lin. $6\frac{1}{2}$, expans. alar. lin. 7.

Habitat in India Orientali.

In Mus. nostr. &c.

Caput globosum, vertice piceo, tuberculis nonnullis conicis instructo; facies lineis tribus albidis notata, lineâque brevi albâ sub oculos; palpi maxillares et antennæ gracillimi fusci, basi rufo; collare valde elongatum; petiolus abdominis tenuissimus, fere longitudine capitis et thoracis conjunctim; femora 4 antica picea; tibiæ et tarsi pallidiores, basi albidi; pedes postici valde incrassati, nigri; alæ hyalinæ, venis discoidalibus obsoletis (venis postcostali, externo-mediana et anali, recurrenti-mediana et 1ma recurrenti-submediana et radiali tantum relictis), stigma hyalina quartam partem costæ occupat.

Var. ♀ caput rufum, facie flavo-lineatum, mandibulis fulvis,

apice nigris, valvulis oviductûs piceis, longitudine thoracis et abdominis conjunctim. (Habitat in Malabaria. Communic. Dom. Newman.)

The obsolete veining of the wings of this insect will be regarded as a generic character by those who adopt the genera separated from *Evania*.

PAXYLLOMMA, Brebisson.

Plancus, Curtis. *Hybrizon*, Esenb. (partim), Fallen.

This curious little genus, in its 13-jointed antennæ and long slender abdomen, attached higher than in the ordinary *Ichneumonidæ*, as also in the elongated and compressed hind legs, offers a certain degree of relation with some of the above genera The form of its mandibles, however, the shortness of its 4-jointed maxillary and 3-jointed labial palpi, and especially the union of the postcostal vein with the costa of the fore wings, sufficiently indicate its relation with the adscitous *Ichneumonidæ*,—the position of the submarginal cells of the fore wings is anomalous, the second of these cells, being obliterated; but *Microdus* (*Bassus calculator*, Curtis) and *Microgaster* show us that this cell is liable to a diminution of size. The number of joints of the antennæ is greatly diminished in some of the most aberrant of the *Adsciti*, there being not more than eleven in some of the species of *Aphidius*. The form of the abdomen, and more especially the place of its insertion on the metathorax, we have seen, affords no exclusive character of the family *Evaniidæ*. So that I think we are justified in rejecting *Paxylloma* from that family.

I have represented the typical species *P. buccata* in my "Introduction to the Mod. Classif. of Insects," vol. ii. p. 134, fig. 74, 17, 18, from a specimen kindly sent me by M. Wesmael.

XXXIX. *On some nondescript Lamellicorn Beetles.* By the Rev. F. W. Hope, M.A., F.R.S., &c.

[Read 5 July, 1841.]

Sp. 1. *Nigidius grandis*, Hope.

Affinis *Figulo verveci*, D. J., at multo major. Niger auriculatus, mandibulis brevibus robustis, externe in cornu luniferum elevatis. Caput postice dilatatum. Thorax sparsim excavato-punctatus, elytris fortiter sulcatis, pedibus tibiis externe serrato-spinosis.

Long. lin. 10, lat. lin. $3\frac{1}{2}$.

This species is apparently the largest hitherto discovered; it was taken at Sierra Leone, by Mr. Strachan. It must here be added, that *Figulus vervex*, of the catalogue of the Baron de Jean, is in reality a *Nigidius*.

Sp. 2. *Lucanus Burmeisteri*, Hope. (Pl. XIII. fig. 3.)

Niger, mandibulis capite thoraceque longioribus, dentibus armatis, binis ad apicem minoribus, tertio fere in medio multo fortiori, apicibus furcatis et interne denticulatis. Caput luniforme, antice elevatum, fronte valde excavato; oculis prominentibus. Thorax longitudine capite æqualis, lateribus in medio acuminatis. Elytra castanea, ad basin nigro triangulo variegata, sutura nigricanti. Pedes concolores, femoribus tibiisque inermibus.

Long. corp. mandibulis inclusis 3 unc. 4 lin., lat. lin. 11.

In Mus. Dom. Hope.

This magnificent insect was lately sent to this country from the Mysore, and I have much pleasure in naming it in honour of Dr. Burmeister, who has so materially increased our information on the subject of the *Lamellicorn* beetles. I regard this insect as the type of a new genus, which I name *Anoplocnemus*, from having all its tibiæ unarmed.

Sp. 3. *Dorcus Darwinii*, Hope.

Affinis *D. Eschscholtzii*, at minor. Atro-fuscus, mandibulis dentatis nigris. Caput postice latum subspinosum. Thorax disco medio elevato, lateribus depressis, valde punctatis. Elytra convexa multipunctata. Corpus infra nigrum. Pedes femo-

ribus piceis, tibiis binis anticis denticulatis, quatuor posticis in medio unispinosis.

Long. lin. $7\frac{1}{2}$, lat. lin. $2\frac{1}{2}$.

Habitat in America Meridionali.

In Museo Dom. Hope.

The above insect I have lately received from Chili. It is named in honour of Charles Darwin, Esq., who has greatly contributed to our acquaintance with the Entomology of Valparaiso, Chili, and other parts of the South American continent.

Sp. 4. *Valgus argillaceus*, Hope.

Fuscus, capite flavo-tomentoso, thorace antice fere cornuto, denticulato, postice angulis rotundatis. Elytra thorace multo latiora et abdomine breviora humeris rotundatis, ano granulifero, tomento asperso. Corpus infra argillaceum, femoribus robustis, tibiis binis anticis dilatatis, externe denticulatis, quatuor posticis mediocribus, unispinosis et tomentosis, tarsisque piceis.

Long. lin. $3\frac{1}{2}$, lat. lin. $1\frac{1}{2}$.

Habitat in India Orientali.

This remarkable species of *Valgus* I have lately received from the Mysore, eventually it will be regarded as the type of a new genus.

Sp. 5. *Gnathocera Natalensis*, Hope.

Smaragdina, capite fere quadrato, marginibus elevatis nigris. Thorax viridis variolosus, lateribus marginatis. Scutellum læve, sparsim punctatum. Elytra viridi-opalina crebrissime punctulata, humeris prominentibus, marginibus elytrorum nigro-elevatis. Podex viridis, postice aureo colore tinctus. Corpus infra viride, femoribus tibiis compressis tarsisque piceis, abdomine in medio fortiter impresso.

Long. lin. 7, lat. lin. 4.

This insect was received lately by me from Natal, in Africa, and hence its specific name. [Arc. Ent. vol. i. pl. 46, fig. 4.]

Sp. 6. *Dicheros ornatus*, Burmeister, MS.

Affinis *Dichcr. bicorni*, Lat.

Niger, caput antice clypeo emarginato, medio excavato, postice tridentato. Thorax convexus, niger, fascià obliquâ rubrâ fere interruptâ notatus, marginibus concoloribus et elevatis. Scutellum magnum. Elytra nigra, maculâ latâ flavâ con-

spicuâ; basi, apice, suturâque nigricantibus. Corpus infra punctatum, binis ultimis segmentis abdominis rubris. Sternum porrectum. Pedes nigri, femoribus rubro-corallinis.
Long. lin. 8, lat. lin. $3\frac{1}{2}$.

This new species of *Dicheros* I received lately from the Mysore, and Dr. Burmeister in his MSS. has named it *ornatus*. [Arc. Ent. vol. i. pl. 36, fig. 7.]

Sp. 7. *Cœlorhina concolor*, Burmeister, MS.

Smaragdina, aut viridi-opalina, clypeo antice valde emarginato. Thorax convexus, punctulatus, marginibus lateralibus elevatis. Elytra concoloria, striato-punctata, humeris nigricantibus. Corpus infra viride, segmentis abdominis medio opalinis, pedibus concoloribus. [Arc. Ent. vol. i. pl. 19, fig. 3.]
Long. lin. 12, lat. lin. 5.

The above species from my Cabinet is named *concolor* in Dr. Burmeister's MSS.: it inhabits Sierra Leone.

Sp. 8. *Schizorhina succinea*, Hope.

Flava, capite antice luteo, postice nigricanti punctulato. Thorax fusco-flavus, maculis duabus nigris in medio disci positis, scutellum atromarginatum; elytra flava, seu succineo colore tincta, podice concolore. Corpus infra pectore nigricanti tomentoso, abdomine flavo. Pedes femoribus compressis, flavis; tibiis tarsisque atro-piceis.
Long. lin. $9\frac{1}{2}$, lat. lin. 5.
Habitat in Nova Hollandia.

Sp. 9. *Cetonia Indra*, Hope.

Rubro-punicea, capite fere quadrato, clypeo subemarginato. Thorax convexus, concolor, quadrimaculatus; binis maculis atris lateralibus parum distinctis, duobus aliis ante scutellum positis. Elytra acuminata, atro-punicea, macula irregulari ochraceo-flava in medio disci notata, secunda minori fere ad externum angulum conspicua. Scutellum satis magnum, sutura elevata ad apicem spinosa. Corpus infra rubro-puniceum, pectore segmentis abdominis utrinque ochraceis maculis insignitis. Pedes concolores et ciliati.
Long. lin. 12, lat. lin. $6\frac{1}{2}$.

This species inhabits Manilla, and was brought to this country by Mr. Cuming, the Conchologist.

Sp. 10. *Agestrata Withillii.*

Nigra, nitida et glabra, clypeo utrinque spinoso. Thorax subconvexus, binis foveis parum distinctis fere ad scutellum positis. Elytra nigra, marginibus elevatis. Corpus infra atrum nitidum, pectore segmentisque abdominis aurantiis maculis insignitis.

Long. lin. 19, lat. lin. 8.

The above insect was received from the vicinity of Bombay, by Col. Withill, in whose honour it is named. Some of the specimens vary greatly in colour, and possess a bronzy metallic splendour which I have not remarked in other *Cetoniadæ*.

Sp. 11. *Agestrata gagates*, Hope.

Totum corpus supra nigrum nitidum, clypeo fere quadrato, lateribus in spinam productis. Thorax lobatus, subconvexus et glaber. Elytra elongata, sutura, marginibus externis elevatis. Corpus infra atrum nitidum, segmentis abdominis utrinque aurantiis maculis insignitis.

Long. lin. 16, lat. lin. $6\frac{1}{2}$.

Habitat in India Orientali, circa Travancore.

Sp. 12. *Macronata Vittigera.*

Nigra, capite valde emarginato, lineâ mediâ aurantiâ insignito. Thorax trivittatus, vittis aurantiis. Elytra 2-vittata, vittis concoloribus ante apicem terminatis. Podex in medio niger, lateribus flavis. Corpus infra atrum, nitidum, segmentis abdominis utrinque aurantiis maculis notatis. [Arc. Ent. vol. i. pl. 28, fig. 6.]

Long. lin. $13\frac{1}{2}$, lat. lin. $5\frac{1}{2}$.

This magnificent insect I have lately received in a collection from the Mysore country; it appears to be unique, and is closely allied to *Macronata Budda*, described by me, from the island of Java.

Pachytricha,* Hope.

Pachytricha castanea, Hope. (Pl. XIII. fig. 4.)

Piceus, capite valde acuminato seu melius subcornuto. Thorax antice utrinque spinosus, marginibus elevatis et punctatus. Scutellum læve, postice rotundatum, piceum. Elytra cas-

* From παχυτριχος, qui crasso pilo est.

tanea, postice acuminata, podice triangulo deflexo brunneo. Corpus infra valde pilosum; capillis cinerascentibus. Pedes picei et ciliati.

Long. lin. 15, lat. lin. $5\frac{1}{3}$.

Habitat in Nova Hollandia.

This remarkable insect is from Australia, and appears to be a genus mediate between *Glaphyrus* and *Chasmatopterus*. Below follows its generic character.

[Corpus magnum, obesum, convexum. Antennæ 10-articulatæ. Labrum magnum, porrectum, bifidum (fig 4 *a*, front of head; 4 *b*, the same within the mouth). Mandibulæ rectæ, apice obtusæ (fig. 4 *c*, 4 *d*). Maxillæ apice valde penicillatæ (fig. 4 *e*). Mentum apice valde emarginatum. Labium è lobis duobus constans. Palpi labiales brevissimi 3-articulati (fig. 4 *f*). Pedes crassi, unguibus omnibus intus dentibus duobus appendiculoque bisetigero instructis. (Fig. 4 *g*).—*J. O. W.*]*

* [Dr. Erichson, in a short notice of the characters of this genus, which appeared in the Journal of Proceedings of this Society, published in the Annals of Nat. Hist. viii. p. 303, observes,—"Ich finde bei dem ex. unsrer Sammlung die Mandibeln klein, schuppenformig, die Spitze hakenformig einwarts gebogen. Die vorgestreckte Leftze und die Form der Mandibeln entfernt diese Gattung von den Melolonthen und schliesst sie vielleicht naher an Euchirus." It is remarkable that Dr. Erichson, having cited the relation with the *Glaphyridæ* mentioned in Mr. Hope's observation, should have taken the pains to prove that it was not related to the *Melolonthidæ*, from which the far more important character of the penicillate edentate maxillæ at once removes it. The mandibles in two specimens which I have dissected, instead of having the extremity hook-shaped and curved inwards, as Dr. Erichson describes, have the outer margin thick and quite straight, and the inner margin very thin, and with the apex obliquely truncated, thus quite disagreeing with the *Melolonthæ*. The relationship suggested with *Euchirus* is of great interest, existing in the form of the mandibles, dilated hind feet and denticulated ungues, accompanied by a setigerous appendage, but the porrected bilobed labrum, edentate maxillæ, and deeply emarginate mentum, are characters of too high importance to allow this relation to prevail over that which it evidently possesses with some of the *Glaphyridæ*.—*J. O. W.*]

XL. *Description of a Species of Moth destructive to the Cotton Crops in India. By* W. W. Saunders, Esq., F.L.S. &c.

[Read 6 June, 1842.]

I beg leave to lay before the Entomological Society an account of a very destructive Lepidopterous insect, which has committed great ravages in the cotton plantations at Broach, in Western India. Cotton being of so great importance in a commercial point of view to our East India possessions, I thought any information relative to the insects which blight the hopes of the cultivator, would be interesting both to the Society and those concerned in the cultivation of the plant.

I am indebted to my friend Dr. Royle for permission to examine and describe this insect, he having received the specimens from Dr. Barn, Superintendent of the Government Cotton Plantations at Broach, with an account of the transformations of the insect.

The following is an extract of the letter which accompanied the specimens.—"The inclosed is an insect which was very destructive to the American cotton which was sown here (Broach), on light alluvial soil. The egg is deposited in the germen at the time of flowering, and the larva feeds upon the cotton seed until the pod is about to burst, a little previous to which time it has opened a round hole in the side of the pod for air, and at which to make an exit at its own convenience, dropping on the ground, which it penetrates about an inch, and winds a thin web in which it remains during the aurelia state. Curious enough, the cotton on the black soil was not touched by it. The native cotton is sometimes affected by it."

The materials I have had to work upon in making this communication are not very satisfactory, the specimens being much broken and rubbed; hence the description must be only taken as the nearest approximation to the truth which I am able to give. The description of the insect, which belongs to the family *Tineidæ*, genus *Depressaria*, as far as I can gain from the specimens, is as follows, and as I can find no species of the above family described as being destructive to the cotton plant, I shall treat the species under consideration as a new one, giving it the specific appellation of *Gossypiella*.

The species is nearly allied to *D. applana*.

Depressaria Gossypiella, mihi.

Dark fuscous brown, the head and thorax somewhat lighter in colour. Anterior wings with an undefined round blackish spot on the disc a little above the centre, and a fascia of the same colour crossing the wings a little above the apex, which itself is black. Under wings of a silvery grey, darker towards the hinder margin. Legs and tarsi black-brown, with the joints light. Length 4-10 inch.

The larva in the dried state is about 4-10ths of an inch long, largest just behind the head, of a dull red colour, with the head dark brown.

In the foregoing extract from Dr. Barn's letter it is interesting to remark, that the cotton grown from American seed is attacked in preference to any other, and that the cotton plant when grown upon "black soil" remains free from injury. The former fact may be accounted for by the American cotton being of a different species to that usually grown in India, and probably offers seeds which are more suitable to the development of the larva. The latter fact, however, I cannot account for, but it is of much interest, and I trust Dr. Barn will throw some light hereafter on the subject. Where there is disease, it is natural to look for a remedy, and if any member present could suggest one in the present case, which is likely to be effectual, I should feel much obliged. The case is evidently attended with much difficulty, but could any plan be hit upon to destroy the moths before the eggs are laid, a cure might be effected, but how to manage this on a large scale I must leave to more practical Entomologists, seeing no remedy which would be within the means of the cultivator.

XLI. *Monograph on the Genus* Campsosternus *of Latreille.* *By the* Rev. F. W. Hope, F.R.S., &c.

[Read 2d August, 1841.]

Latreille, in the "Annales" of the Entomological Society of France, first separated *Elater fulgens* of Fabricius from other *Elateridæ*, and applied to it the name of *Campsosternus*. He appears to have been unacquainted with other species, as no mention is made of them, and from his short published characters it might almost be inferred that he hesitated in detaching it from the magazine genus *Ludius*, unless, perhaps, he intended at a future time more fully to detail them. Of late years our acquaintance with the East Indian forms of insects has greatly increased, and amongst the numerous additions to the *Coleoptera* of that magnificent continent, some *Elaters* closely allied to *fulgens* of Fabricius have enriched our collections. In my late visit to Paris I observed some undescribed species, and possessing several others of great beauty and metallic splendour, I now describe and submit them to the notice of the Entomological Society.

Elater contrasted with *Buprestis* can scarcely pretend to vie with the latter family in metallic splendour, or in the various colouring of the species; in magnitude, however, *Tetralobus* surpasses the former. With regard to the distribution of the species of *Campsosternus*, it appears to be altogether an Oriental genus, and is confined almost to China, the East Indies, and the neighbouring islands. In the present monograph fourteen species are described, and there can scarcely be a doubt that many others, closely allied to those in the following pages, will yet be discovered in the same regions. It is scarcely necessary to add, perhaps, that little is known respecting the larvæ of these gigantic insects; and it is solely with the hope of directing the attention of our English naturalists in the East to these magnificent insects, that I have taken them up at present. Any information respecting their habits is much wanted; should they turn out upon investigation only half as destructive as our wireworms in Europe, their ravages would indeed produce most serious consequences. I am inclined to consider them rather as living on the vegetation of trees and shrubs, than on herbage. This point at present is not satisfactorily ascertained, and any information respecting their larvæ and habits (which appear to be unknown) is much desired. In concluding these brief remarks on the genus *Campsosternus*, I

think it necessary to detach it from Monsieur Latreille's magazine genus *Ludius*, and regard it as belonging to a family of the *Elateridæ*, which is peculiar to the East Indies. After a short period I hope to add various remarks relating to these insects, as some valuable notes, written in India, on their general natural history, are now on their way to me in England. At the same time, also, I propose examining our rich metropolitan cabinets, in order to make the monograph as perfect as possible; a supplement therefore will be forwarded to the Society as soon as possible.

If any gentleman present is acquainted with any undescribed species belonging to the above genus, the loan of them is requested for examination.

CAMPSOSTERNUS,* Latreille.

For the generic characters, see Latreille's Memoir in the French Entomological "Annales."

The following short Latin characters may be added to those of Latreille:—

"Scutellum reverso-cordatum, antice emarginatum, postice latius truncatum. Thorax trapezoidalis elevatus, angulis posticis obliquis, longitudine latitudini æquali. Prosternum antice declive foveâ transversâ impressum."

Sp. 1. Type of the genus *Elater fulgens* of Fabricius.

E. cyaneo-nitidus, subtus cupreus, elytris acuminatis. Vide Fab. Ent. Syst. 2, 220, 22.

Long. lin. 20, lat. lin. $5\frac{1}{2}$.

Habitat in Chinâ.

Elater fulgens, Oliv. Ent. pl. 4, fig. 43.

"E. violet, très-brillant en dessus, cuivreux en dessous; côtés du corselet verts."

E. supra violaceus nitens, infra cupreus, thoracis lateribus viridibus. Elater auratus. Drury, Ill. of Ins. tom. 2, pl. 35, fig. 3.

Antennæ nigræ, filiformes, subserratæ, thoracis longitudine. Thorax lævis, violaceus nitens, lateribus viridibus. Elytra lævia violacea, apice acuta. Corpus subtus pedesque cuprei nitidi.

* From καμπω and στερνον.

Sp. 2. *C. sumptuosus*, Hope.

Aurato-viridis, nitidus, capite antice subfoveo lato. Thorax marginibus elevatis, emarginatus, antice convexus, postice in medio protensus, lobo ad scutellum extenso, lineâque longitudinali fortiter impressus. Elytra aurato-viridia, acuminata, glabra, nitida, et punctulata. Corpus infra concolor, ultimo segmento abdominis roseo colore tincto.

Long. lin. $14\frac{3}{4}$, lat. lin. 5.

Habitat in insula Javana?

The above species I described from the rich collection of Monsieur Dupont at Paris, and although the locality mentioned is the island of Java, I am inclined to suspect its true locality is Manilla, as one specimen in the Parisian cabinet is labelled from thence; its range however may be equally extensive with other *Colcoptera* of the east.

Sp. 3. *C. Aureolus*, Hope.

Metallico-viridis, roseoque colore tinctus. Caput antice punctulatum, antennis nigricantibus, articulis compressis. Thorax vix subconvexus, parum depressus, lateribus elevatis, tenuissime punctulatus, postice lobo ad scutellum protenso. Elytra viridia, acuminata, striato-punctata, striis haud fortiter impressis. Corpus infra concolor subpubescens, pedibus piceo-tomentosis, femoribus pallidioribus.

Long. lin. $14\frac{1}{4}$, lat. lin. 4.

Habitat circa Singapore.

A variety of this species, in M. Dupont's collection at Paris, I named *Calanus*. As I have since seen many other varieties, the latter must be abandoned, as there cannot exist a doubt of its identity with *aurcolus*. The above species is named *aureolus* in Griffiths' "Animal Kingdom," and was figured from a specimen in my cabinet; the locality, according to Dupont, is Java, which is probably erroneous. Some individuals I have received from the Tenasserim coast.

Sp. 4. *C. Cantori*, Hope.

Corpus supra et infra æneum, thorace marginato et tomentoso, elytris acuminatis nitidis. Caput inter oculos excavatum, antennis palpisque nigricantibus. Thorax convexus, lateribus elevatis et roseo-cupreis, disco tomentoso et subtilissime punctulato. Elytra acuminata, ænea, substriata, sublente

tenuissime punctulata. Corpus infra æneum, roseoque colore tinctum, pedibus concoloribus.

Long. lin. $22\frac{1}{2}$, lat. lin. $6\frac{1}{2}$.

Habitat in agro Assamensi.

The above insect appears to be the largest of the genus hitherto received from the East Indies. It was brought to this country from Assam by Dr. Cantor the erpetologist, and was presented to me by that individual, with several other nondescripts from the same locality: it is named in honour of that able zoologist.

Sp. 5. *C. Latreillii*, Davaucel.

Purpureo-viridis. Caput antice excavatum. Thorax in medio convexus, purpureus, lateribus utrinque subdepressis roseoque colore tinctis, marginibus externis elevatis. Elytra viridia, purpureo colore tincta, glabra, tenuissime punctata. Corpus infra aurato-viride, nitidum, pedibus obscurioribus et subtomentosis.

Long. lin. $15\frac{1}{4}$, lat. lin. 5.

Habitat in Cochin China; e Museo Dom. Dupont.

The above insect was collected by Monsieur Duvaucel in his voyage to China. The name of Latreille was probably given it by the Baron De Jean. [A species thus named is described by M. Guérin Méneville, in the Voyage of M. Delessert, p. 37.]

Sp. 6. *C. Wilsoni*, Hope.

Aurato-viridis, lateribus thoracis subroseo-tomentosis, elytris viridioribus. Caput inter oculos excavatum, pilosum, antennis atro-violaceis. Thorax subconvexus, punctulatus et tomentosus, medio viride, lateribus æneis, roseoque colore tinctis, marginibusque elevatis. Scutellum æneum, postice rotundatum. Elytra viridia, acuminata, lateribus auro-fluentibus. Corpus infra roseo-metallicum, mesosterno cyaneo, femoribus et tibiis violaceo-æneis, subpilosis et punctulatis, tarsis unguibusque cyanescentibus.

Long. lin. 18, lat. lin. $3\frac{3}{4}$.

Habitat in Maderaspatana.

The above insect I have received from Madras and the Nilgherry Mountains, it is probable also that its range extends far into Bengal: it is subject to vary much in size; the largest specimen of my collection is the one above described.

Sp. 7. *C. smaragdina*, Hope.

Viridis, præcedenti affinis, at minor. Caput inter oculos excavatum, subrugosum, antennis palpisque nigro-violaceis. Thorax convexus, lateribus externis elevatis, angulisque posticis valde acutis. Scutellum nigro-æneum, postice rotundatum. Elytra atro-viridia, sub lente subtilissime punctulata, apicibus acutis. Corpus infra cyaneo-viride, femoribus tibiis violaceis, tarsisque atro-piceis.

Long. lin. 14, lat. lin. $4\frac{1}{2}$.

Habitat in Maderaspatana.

In Mus. Dom. Hope.

The above species was received from Madras. It appears to be unknown to the continental Entomologists, and is unique in my collection.

Sp. 8. *C. Guerinii*, Hope.

It is probable that this species will be described by Monsieur Guérin under the name of *Delessertii*. I therefore do not give its description at present. [P.S. It is now described under the latter name by M. Guérin, in the Voyage of M. Delessert, p. 38.]

Sp. 9. *C. Duponti*, Hope.

Viridis. Caput subfoveolatum, punctatum. Thorax antice convexus, lobo ad scutellum extenso, angulis lateralibus subdepressis. Elytra acuminata, viridia, tenuissime punctulata. Corpus infra subaurato-viride, pedibus obscurioribus.

Long. lin. 12, lat. lin. $3\frac{1}{4}$.

Habitat in Agro Malabarensi.

The above insect was described by me from the collection of Monsieur Dupont, during my late sojourn in Paris, and is named after that zealous collector.

Sp. 10. *C. rosicolor*, Hope.

Puniceo-viridis roseoque colore tinctus. Caput antice excavatum et punctulatum. Thorax vix convexus, punctatus, postice subprotensus, roseus. Elytra acuminata, striato-punctata, striis punctisque fortiter impressis, suturâ marginibus externis elevatis et roseis. Corpus infra viride,

punctatum, subroseo colore tinctum, pedibus flavo-testaceis, tarsis obscurioribus.

Long. lin. $11\frac{1}{2}$, lat. lin. $3\frac{1}{4}$.

Habitat in Java.

This elegant species was described from the rich collection of Monsieur Dupont at Paris.

Sp. 11. *C. Proteus,* Hope.

Corpus supra et infra aurato-viride. Caput inter oculos subexcavatum, antennis nigricantibus. Thorax convexus, sub lente subtilissime punctulatus, lateribus externis elevatis, disco postice sublobato, versus scutellum protenso et parum elevato. Scutellum antice et postice rotundatum. Elytra aurata, splendida, lateralibus marginibus elevatis, sutura violacea, apicibusque acuminatis. Pedes virides, tarsis unguibusque piceis.

Long. lin. 16, lat. lin. 5.

Habitat in Manilla.

The above species is very variable in size and colour, and several specimens differ considerably in form: I have therefore named it *Proteus;* some of the varieties are blue, green, golden, and bronzed; they were brought to this country from the Manilla Isles by Mr. Cumming, and appear to be exceedingly abundant as well as variable. It is probable that two or three species may be confounded under the name of *Proteus.*

Sp. 12. *C. Stephensii,* Hope.

Long. lin. 14, lat. lin. 4.

Vide my description of this species in General Hardwick's collection, in the Zoological Miscellany.

Sp. 13. *C. Leachii,* Hope.

Chalybeo-viridis, thorace cærulescenti, elytrisque acuminatis et æneo-virescentibus. Caput inter oculos subexcavatum, antennis atro-violaceis. Thorax in medio parum convexus, lateribus externis marginatis, angulis posticis acutis. Elytra thorace convexiora, viridia, apicibus acutis, lateribusque elevatis. Corpus infra cærulescens seu aurato-violaceum, femoribus tibiis concoloribus tarsisque obscurioribus.

Long. lin. 17, lat. lin. $5\frac{1}{2}$.

Habitat in India Orientali circa Singapore.

The present species diverges from the Latreillian type. It is more robust in form and has the thorax and elytra considerably depressed; by some persons it would be regarded as a subgenus. It has been in my collection some years, and was named in honour of my friend Dr. Leach.

Sp. 14. *C. Eschscholtzii*, Hope.

Affinis præcedenti, at totum corpus supra et infra chalybeo-violaceum. Caput inter oculos vix foveolatum, antennis atro-violaceis. Thorax depressus, vix convexus, lateralibus marginibus valde elevatis, angulis posticis parum latioribus et acutis. Elytra chalybeo-violacea, splendida, sub lente tenuissime punctulata, marginibus externe elevatis. Pedes violacei, tarsis infra piceis capillis obsitis.

Habitat in Manilla.

The above species is named after Dr. Frederick Eschscholtz, and is closely allied to *Leachii;* it was brought to England by Mr. Cuming the conchologist, and appears to be taken in Manilla in extraordinary numbers.

XLII. *Notes on the Parasites of the Genus* Nomada *and on other Insects.* *By* Mr. F. Smith.

[Read 4 April, 1842.]

On the 18th of June, 1839, I discovered a colony of *Eucera longicornis*, and having learned from Mr. Shuckard that the "*Nomada Schäfferella*" was parasitic upon it, I watched the spot some hours, and at that time succeeded in taking only two specimens; I therefore concluded I was too late in the season for them, finding the majority of the *Euceræ* were torn in the wings and their colours faded to light grey.

1840, June 2nd. I again visited the spot and found both *Eucera* and its parasite abundant; even then I was rather late for the males of the *Nomada*. I took but three specimens of the latter, the male of which is the "*Nomada connexa*," Kirby. I observed the *Nomada* entering the burrows of the *Eucera*, and sometimes even jostling which should enter first; the *Nomada* generally conquered, and then the bee would fly off. They appear to live in perfect harmony together; but if the parasite enters a burrow, and the bee arrives before it has quitted the nest, she appears to discover its presence immediately, and the moment she inserts her head into the entrance, she stops short, and quickly retreating flies off. Being now satisfied of the connection existing between the bee and its parasite, I became anxious to attempt breeding them under my own personal observation, and for that purpose, in August 1840, I dug up several nests, which are formed thus:—the female burrows a cylindrical hole to the depth of about six or seven inches, in a stiffish clay, and then forms a chamber that would about contain the cocoon of the silk worm; and having (as appears from the polished surface) smoothed and coated the cell with gluten she deposits at the bottom, to the extent of about one-fourth, a dark coloured mixture, probably pollen and honey; then she stores about two-fourths of the remaining space with a bright yellow pollen, and the remaining fourth with a substance nearly white: this I found to be the case in four nests which I dug up in June 1840. I was unsuccessful in my attempt to breed the insects; they all perished, I presume, for want of a sufficient degree of moisture, as I did not place the nests in a sufficient quantity of mould, nor keep them moist, as in their natural position.

1841, March 15th. I visited the spot, and after an hour's labour succeeded in digging out several cocoons containing bees or parasites. I took a quantity home, and on opening the cells I

was delighted to see two specimens of the *Nomada* fully developed and active in two of the cells. The bees which I have examined are in different states of development.

These observations are, I regret to say, far from complete, and it will be for future observation to clear up several points in the economy of these insects. I should observe, that the cells containing the *Nomadæ* had a mere filmy coating or cocoon, closely resembling goldbeater's skin, in which the insect was found. I should, therefore, suppose the parasite to be either hatched sooner than the bee and to devour the provision previous to the development of the latter, or that the parasite removes the egg of the bee and deposits her own in its place; or, it may be, that the bee having deposited a quantity of food previous to laying her egg, the parasite deposits hers, and the bee then discontinues her labours in that nest and commences another; for when the size of the two insects is considered, the food required by the bee would be, I should conclude, considerably more than what would be required by the parasite. These theories I hope in time to clear up; in the mean time I lay before the Society such information as I am possessed of, and there being so much to unravel, I hope those gentlemen who have more time to look after these things than myself will be induced to attempt the solution of the difficulty. I, for my own part, shall not be idle.

In April 1841 I found some specimens of the supposed larvæ of "*Meloe proscarabæus*" in profusion, in the flowers of a wild plant; as many as twenty in some flowers. I might have collected thousands. This was in Bishop's Wood, Hampstead. My reason for exhibiting them is, that in June of the same year I found a similar insect or larvæ attached to the underside of the abdomen of *Nomada Schäfferella*. They are evidently distinct species, different in form and colour, one being black, the other yellow.

Having stated at a previous meeting of the Society that I had bred the same species of parasite from several distinct species, and even genera of insects, I now exhibit five specimens of a species of *Cryptus*, three bred from the cocoons of *Epipone levipes*, the other two from the cocoon of *Trichiosoma lucorum;* they are all females, and on the closest examination I believe them to be the same species.

XLIII. *Contributions towards the Classification of the* Chalcididæ. *By* A. H. Haliday, Esq., M.A.

[Read 5th December, 1842.]

Ordo. HYMENOPTERA.

Familia. CHALCIDIDÆ.

Sectio. Pentameri.

Sub-sectio. Isomeri.

Tribus. Pireniani.

Antennæ prope os insertæ, breves, 10-articulatæ. Caput ovatum, nutans, fronte canaliculata. Thorax subdepressus, lævisculus, scutelli axillis distantibus, metathorace brevi obtuso. Abdomen ♂ compressum. Terebra ♀ compressiuscula. Alæ metacarpo brevissimo subnullo.

Obs. *E. Pteromalinis* transitum in hancce tribum *Gastrancistri* parant, metacarpo producto facilè distinguendi. Ex adverso hæc ad *Spalangianos* accedit.

Palpi maxillares	4-articulati.	Oculi	distantes . . .	*Calypso.*
			♂ approximata .	*Macroglenes.*
	2-articulati			*Pirene.*

i. Calypso.

Palpi maxillares 4-articulati. Oculi distantes.

1. *serratulæ.* In floribus *Serratulæ arvensis* frequens.

ii. Macroglenes, West.

Palpi maxillares 4-articulati. Oculi ♂ maximi vertice approximati.

1. *umbellatarum.* Antennarum articulis flagelli 2 prioribus brevissimis perfoliatis, ♂ ♀. In floribus *Angelicæ sylvestris* sat frequens, etiam *Senecionis Jacobeæ.*
2. *penetrans*, Kirby. Articulis flagelli 3 prioribus brevissimis perfoliatis, ♂ ♀. In floribus *Spirææ ulmariæ* minus frequens. In *Cerealibus* (Kirby).
3. *microcerus.* Articulis flagelli 4 prioribus brevissimis perfoliatis, ♂ ♀. Synon. ♀ *Pirene graminea*, Ent. Mag. i.

iii. Pirene, Ent. Mag. i.

Palpi maxillares 2-articulati. Labiales obsoleti.

* Antennarum articulis flagelli 5 brevissimis perfoliatis, mas scapo ovato dilatato.

1. *varicornis*, Ent. Mag. i. Abdomine ♀ compressiusculo, capitis thoracisque longitudine. In paniculis *Anthoxanthi odorati* ♀ frequens, ♂ rarissime.
2. *rubi*. Abdomine ♀ depressiusculo thoracis longitudine. ♂ ♀. In floribus *Rubi fruticosi* ♂ copiosè, ♀ infrequens.
3. *chalybea*, Ent. Mag. i. Abdomine ♀ thoracis longitudine, vix compresso. Terebra brevi. ♂ ♀. In *Cerealibus*, etc. non infrequens.
4. *eximia*, Ent. Mag. i. Abdomine ♀ subcompresso, thorace longiore; terebra dimidii abdominis longitudine. ♀. In *Cerealibus* rarissime.

Subfam. *Eulophini*.

Tarsi 3-4-articulati. Tibiæ anticæ calcari minutissimo subulato. Palpi subæquales, breves, biarticulati, apice attenuati. Mandibulæ apice denticulatæ. Ligula brevis, obtusa. Antennæ (prope os insertæ) geniculatæ, 6-11-articulatæ.

A. Tarsi 4-articulati. Antennæ articulis 7-11.

B. Nervus subcostalis leni flexulâ costam appetens.

I. ELASMUS, *Westwood*.

Antennæ 8-articulatæ. Ulna elongata. Nervus humeralis integer.

Eulophus flabellatus, Fonscolombe.

II. EPICLERUS, *Haliday*.

Antennæ 11-articulatæ. Mesothoracis parapsides discretæ. Scutellum integrum, transversè impressum. Abdomen petiolatum. Metacarpus productus. Radius brevis.

Entedon Parujas, Walker.

III. EUPLECTRUS, *Westwood.*

Antennæ 8-articulatæ. Mesothoracis parapsides discretæ. Scutellum sulco cinctum, axillis fere conniventibus. Abdomen petiolatum. Tibiæ posticæ calcaribus binis elongatis. Coxæ posticæ magnæ. Metacarpus productus. Radius longiusculus.

Pteromalus bicolor, Swederus.

IV. ELACHESTUS, *Spinola.*

Antennæ 8-articulatæ. Mesothoracis parapsides discretæ, raro connatæ, postice leviter aut vix emarginatæ. Scutellum sulco raro obliterato cinctum. Abdomen petiolo brevi. Prothorax magnus. Tibiæ posticæ calcari unico minutissimo. Metacarpus productus. Radius longiusculus.

Ichneumon rufescens, Rossi.

V. LOPHOCOMUS, *Haliday.*

Antennæ mari 10-articulatæ, nodosæ verticillatæ. *Fem.* 9-articulatæ. Ulna mediocris. Radius longus.

Cirrospilus Anaitis, Walker.

VI. EULOPHUS, *Geoffrey.*

Antennæ 8-articulatæ. Mesothoracis parapsides connatæ, postice emarginatæ, sinu profundo rotundato. Scutellum integrum. Abdomen petiolo brevissimo seu inconspicuo. Metacarpus productus. Radius ut plurimum longus, angulum acutissimum fingens.

Diplolepis ramicornis, De Geer.

VII. CIRROSPILUS, *Westwood.*

Antennæ 7-articulatæ. Scutellum lineis 2 elongatis impressum. Abdomen subsessile. Radius longiusculus.

Cirrospilus elegantissimus, Westwood.

BB. Nervus subcostalis abrupte incrassatus et quasi infractus, oblique costam attingens.

VIII. TETRASTICHUS, *Haliday.*

Antennæ 9-articulatæ ♂, 8-articulatæ ♀. Mesothoracis parapsides discretæ, postice incisæ. Scutellum convexum,

lineis 4 elongatis parallelis exsculptum. Abdomen subsessile. Radius ab alæ apice quam longissime remotus. Metacarpus evanescens.
Cirrospilus Attalus, Walker.

IX. EUDERUS, *Haliday*.

Antennæ 9-articulatæ, capitulo 3-articulato ♀. Mesothoracis parapsides discretæ, postice acute incisæ. Scutellum integrum. Metacarpus productus. Radius brevissimus. Alæ subglabræ. Abdomen subsessile.
Entedon Amphis, Walker.

X. ENTEDON, *Dalman*.

Antennæ 7-8-articulatæ.* Radius brevissimus. Mesothoracis parapsides non nisi leviter emarginatæ.
Entedon Amanus, Walker.

XI. PTEROPTRIX, *Westwood*.

Antennæ 7-articulatæ, clava 3-articulata ♀. Radius a costa vix disjunctus. Metacarpus obsoletus.
Pteroptrix dimidiatus, Westwood.

AA. Tarsi 3-articulati.

XII. TRICHOGRAMMA, *Westwood*.

Antennæ 6-articulatæ. Alæ anticæ latæ. Radius capitatus. Metacarpus obsoletus.
Trichogramma evanescens, Westwood.

Genus AGAMERION, Haliday.

Corpus confertim punctatum. Caput anticè subrotundum, subtus attenuatum; vertex immarginatus. Oculi magni, subtilissimè pubescentes. Ocelli in triangulum æquilaterum. Antennæ infra oculos et supra clypeum insertæ, basi remotæ; scapus dimidio flagelli æqualis, in foveâ lineari quæ cum adversâ concurret, superne foveam V formam profundam ad verticem ferè continuatam fingens et triangulum

* The minute joint often visible between the second and third is not counted, nor the terminal spine.

acutum abruptum includens; flagellum validum, basi et apice attenuatum, articuli continui oblongi, 1mus brevissimus, annularis, 4us 2o major, sequentes parum decrescentes, capitulum acuminatum articulo 10mo vix dimidio longius. Prothorax sat magnus, transversus, parum angustatus. Mesothorax antice rotundus, declivis; parapsides et axillæ discretæ distantes; scutellum rotundum, tergo planiusculum, apice devexum; scutum transversè carinatum, medio productum, obtusum. Metathorax brevis, sublævis, medio carinatus. Petiolus brevissimus, annularis, lævis. Abdomen ovatum, depressum, thorace brevius et parùm angustius; segmentum 2um 3o dimidio longius, 3um et sequentia subæqualia. Femora valida. Metafemora incrassata, margine infero versus apicem obsoletè serrulata. Metatibiæ validæ, subrectæ, extus brevissimè ciliatæ, apice truncatæ, calcaribus 2 magnis. Alæ pubescentes; nervus costalis ulnâ dimidio longior; radius ad alæ trientem productus, obliquè subarcuatus, apice subdentatus; metacarpus illo longior.

Sp. *Miscogaster Gelo.* Monogr. Chalciditum, ii. 27.

Genus LELAPS, Haliday.

Sp. 1. *Lel. Sadales.* Fem.

Niger, ferrugineo-varius, antennis fuscis, pedibus pallidis, basi albo variis, proalis fumatis.

Merostenus Sadales, Walker, Monogr. Chal. ii. 93.

Niger, prothorace, antennis basi, squamulis abdomineque apice ferrugineis. Pedes pallidiores, procoxis et mesocoxis omninò, metacoxis apice femoribusque basi abidis. Caput confertissimè rugulosum, opacum; frons setis paucis validis nigris aspersus; occiput marginatum. Thorax confertissimè rugulosum, opacum. Mesothoracis dorsum setis paucis validis nigris aspersum; scutellum posticè confertissimè striatum. Metathorax rugosus, reticulatus. Antennæ fuscæ; articulus 3us 1mo ferè æqualis, 4to ferè duplo longior; articulus 2us sublinearis, 4to ferè æqualis. Mesofemora et metafemora fusco-maculatis. Mesotibiæ ante medium et metatibiæ prope apicem obscuriores. Proalæ fumatæ, puncto costali ad nervi costalis concursum et fasciis lunatis subconnexis ante alæ apicem fuscis densiùs pubescentibus. Metalæ subhyalinæ. Squamulæ flavescentes. Petiolus brevis, annularis, substriatus. Abdominis segmenta reliqua lævissima; 2um longè maximum, apice integrum; 3um et sequentia brevissima,

linearia, transversa; 7um majus, apice ferrugineum; 8um subulatum, ferrugineum. Terebra ferruginea, quarto abdominis longitudine æqualis.

Sp. 2. *Lel. pulchricornis*, Haliday.

Nigro-cupreus, antennis fuscis albo-cinctis, pedibus flavis, alis ferrugineo-variis.

Nigro-cupreus, transversè rugulosus. Clypeus ferè testaceus, apice subtridenticulatus. Palpi pallidè flavi. Maxillæ ferè testaceæ. Antennæ fuscæ, ferè corporis longitudine; articulis 1mo et 2do, 3tio apice, 4to et capitulo albidis; articulus 3us 1mo æqualis, 4us 2do dimidio longior. Mesothoracis scutum posticè striatum; mesopleuræ læves, nitidæ, anticè confertè punctulatæ. Metathorax reticulatus, rugosus; pleuræ nigræ. Petiolus lævis. Abdomen læve, æneo-nigrum, basi cupreum, statura ut *L. Sandalis*, modò segmenta apicalia parùm breviora; terebra abdomine vix brevior, pallidè ferrugineum apicibus nigricantibus. Pedes pallidè flavi; metacoxæ transversè substriatæ, basi fuscæ. Alæ fumato-hyalinæ, disci maculâ magnâ oblongâ, basi et apice ramulo nervi ulnaris basin et radii apicem attingente, fusco-ferruginea; macula alia orbiculata intra alæ apicem punctum fuscum includens.

Taken in St. Vincent's Isle, by the Rev. Lansdown Guilding.

Sp. 3. *Lel. avicula*, Haliday, mas.

Niger, pedibus ferrugineis, alis immaculatis.

Niger, subtilissime et confertissime rugulosus. Antennæ gracillimæ, filiformes, corpore dimidio longiores, flagello piloso; articuli 1us et 2us ferruginei; 2us obconicus, 3us 1mo dimidio longior; 4us et sequentes paulatim decrescentes, omnes discreti; annellus indistinctus. Clypeus ferrugineus. Mandibulæ ferrugineæ. Prothorax fusco-testaceus. Scutellum apice striatum. Metathorax rugosus, reticulatus. Petiolus linearis, rugulosus, metacoxis triente brevior. Abdomen læve, obovatum, depressum, nitidissimum. Pedes pallidè ferruginei; metacoxæ transversè substriatæ, basi fuscæ. Alæ immaculatæ, obscuro-hyalinæ; nervi fusco-ferruginei. Squamulæ pallidè ferrugineæ.

Genus OPHELIMUS, Haliday.

Caput hemisphericum, foveâ frontali antennarum scapum excipiente. *Antennæ* paullo infra mediam faciem insertæ, 8 *articulatæ*;

clava crassa, 3-articulata. Prothorax perbrevis. Mesothoracis *parapsides discretæ*, sinu postico rotundato. *Scutellum elineatum*. Abdomen subsessile. Proalæ humero subinfracto, ulnâ brevissculâ, radio mediocri, *metacarpo tenuissimo*. *Tibiarum calcaria magna*, *numero* 1, 1, 2.

Sp. 1. *O. Ursidius*. *Eulophus Ursidius*, Walker, Monogr. Chal. ii.

Viridi-æneus, tibiis flavis, tarsis posterioribus fasciâ albidâ; antennis thoracis longitudine, clavâ ovatâ.

Sp. 2. *O. Sabella*. *Eulophus Sabella*, Walker, Monogr. Chal. ii.

Viridi-æneus, trochanteribus tibiis tarsisque flavis, tarsis apice nigris; antennis thorace brevioribus, clavâ obtusâ.

Synon. *Cirrospilus Prymno*, Walker, M. C. ii.

Sp. 3. *O. Vannius*. *Cirrospilus Vannius*, Walker, Monogr. Chal. ii.

Viridi-æneus, tarsis posterioribus et genubus albidis, illis apice nigris; antennis capitis longitudine, clavâ ovatâ maximâ.

Eulophus Euryalus, Haliday.

E. Westwoodii affinis (articuli biramosi). Minor, gracilior, æneonitidus, *metathorace lævi*. Abdomen anticè maculâ fuscâ, pallidâ. Pedes flavi, coxis et metafemoribus fusco-viridibus. Antennæ articulus 1us flavus, apice fuscus; reliqui fusci. Alæ hyalinæ; squamulæ flavæ; nervi dilutè fusci.

XLIV. *Memoir on the Genus* Cermatia *and some other exotic* Annulosa (*in a Letter addressed to the Secretary*). *By* R. Templeton, Esq., R.A.

[Read 3 October, 1842.]

(Plates XVI. and XVII.)

Colombo (Ceylon),
May 19th, 1842.

My dear Westwood,

I send to you, "per Tigris," a present for the Entomological Society, which I hope will prove an acceptable one, though you may be at first rather surprised to find that it is not a present of insects. This it is.—In this country, along the marshy banks of the large rivers, grows a large handsome tree, named *Sonneratia acida* by the younger Linnæus; its roots spread far and wide through the soft moist earth, and at various distances along send up most extraordinary long spindle-shaped excrescences four or five feet above the surface. Of these Sir James Edward Smith remarks:—"What those horn-shaped excrescences are, which occupy the soil at some distance from the base of the tree, from a span to a foot in length, and of a corky substance, as described by Rumphius, we can offer no conjecture." Most curious things they are, they all spring very narrow from the root, expand as they rise, and then become gradually attenuated, occasionally forking but never throwing out shoots or leaves, or in any respect resembling the parent root or wood. They are firm and close in their texture, nearly devoid of fibrous structure, and take a moderate polish when cut with a sharp instrument; but for lining insect boxes and making setting boards, they have no equal in the world, the finest pin passes in with delightful ease and smoothness, and is held firmly and tightly, so that there is no risk of the insects becoming disengaged: with a fine saw I form them into little boards and then smooth them with a sharp case-knife, but the London veneering mills would turn them out fit for immediate use, without any necessity for more than a little touch of fine glass paper. Some of my pigmy boards are two feet long by three and a half inches wide, which is more than sufficient for our purpose, and to me they have proved a vast acquisition. The natives call them "Kirilimow," the latter word signifying "root." The above may interest some of your botanical friends.

My professional engagements have prevented my doing more than making myself acquainted with the habitats of insects I

intend to capture, and, besides, I am never away from Colombo where insects are by no means plentiful, so that I have as yet had little opportunity of making a collection. Of my old pets, the spiders, I bottle up all I see, to be reserved for future examination.

On turning over Guérin's "Iconographie" some time ago, I was much surprised at his drawing of *Machylis polypoda;* it resembles mine in no respect, though I see that M. Milne Edwards, in the new edition of Lamarck, unhesitatingly declares both indentical with *Lepisma polypoda* of Linnè. It shows how necessary sketches are to accompany the descriptions of insects of obscure tribes, and I have no doubt the sketches in question are taken from essentially distinct animals. To be satisfied that they are really distinct, compare the front views of the heads: in mine the labrum (chaperon) is broadly developed, in his elongate; in mine the maxillary palpi and (in some measure) the labial are robust, in his slender; similar differences in the antennæ, and, if you might judge from the basal portion of this latter, (figured 1 *a*, Guérin,) such an extraordinary difference is exhibited that one would hardly imagine they belonged to the same genus; and still more striking differences are discovered in the articulations of the caudal setæ. That neither one or other is *Lepisma polypoda* of Linnè, I have no longer any doubt; the habitat of this latter everywhere given is "*littoribus lapidosis*," a locale I never met one in; all that I have seen have been in dry stone fences, especially when the interstices are overgrown with moss. Fabricius, in his "Species Insectorum," quotes the Linnæan habitat, and moreover adds "aliam simillimam inveni cauda quintuplia," which nearly satisfies me that both are alluding to Leach's *Petrobius maritimus,* to which the latter observation correctly enough applies, since if a dozen of them be caught such differences occur in the length and appearances of the setæ, that on a cursory examination you may hold them as having five setæ and be puzzled as to their relative lengths.

To settle all these difficulties, it only remains for you to request your Swedish correspondents to examine the *Lepismidæ* of their stony shores, assume that Linnè drew his description from those found in the habitat he gives, and that they are the true *Lepismæ polypodæ,* and if they in no ways differ from Leach's insect sink his name and retain *Machilis polypoda* for Guérin's, which must clearly be Latreille's, and call mine *Machilis dispar.* I met with specimens in dry stone fences at Mr. Thompson's seat, three miles from Belfast, which I have a faint recollection of thinking different from that I figured: I wish you would procure some and

examine them. I wish I could persuade you to give us a monograph of the whole tribe, describing all you can get hold of in Britain or from your continental friends, and restoring the proper generic names. As a retaining fee I send you one to be included among the true *Lepismæ*.

Lepisma nivco-fasciata. (Pl. XVI. fig. 1—7.)

Intensely black, with a broad white band along the posterior margin of the first dorsal plate. Head with several diverging bunches of yellow setæ anteriorly and laterally. The margins of the thorax similarly distinguished. A row of dots near the posterior dorsal margin of each abdominal ring, having four or five similar setæ, two invariably projecting backwards, the rest outwards. Body beneath silvery, the abdominal rings on each side with two rows of diverging bundles of yellow setæ. Legs, antennæ, and maxillary palpi yellow, caudal appendages fuscous.

The caudal appendages, (fig. 2,) compared with the length of the body, are of variable length, composed of short thick rings, each with numerous rather long stiff hairs directed directly outwards, and the apical margin crowned with minute hairs projecting backwards, every third or fourth with long, strong, stiff spines standing at right angles.

The antennæ, setaceous, arise with two naked joints, the first short, the second rather long; beyond the basal third the antennæ presents a singular character, it would seem that every four united to form one joint subdivided into three short and one long divisions, the latter armed with bristles (fig. 3*a*, 3*b*, 3*c*): the same character would seem to pertain to those nearer the head, but the divisions are so short and hairy that I could not satisfy myself that it was so.

The young differ so much from the mature insect that I took them at first for a different species: they are fuscous or atrous; antennæ, legs, and appendages very pale, the thoracic plates are proportionally less broad, and the first is devoid of the white marginal band.

When the little creature is moving rapidly the double pair of auxiliary legs are dragged along merely supporting the hind part of the abdomen, but when it moves very slowly I have occasionally noticed an ambulatory movement, but nothing resembling that of true legs; in fact, the terminal joint being clothed with an irregular brush of minute hairs would seem to render it impossible that the animal could derive any advantage from it as such.

The old Dutch books in the libraries are infested with these *Lepismæ*, and suffer much from their inroads.

The *Lepismadæ* should be separated most markedly from the other division of the *Thysanura* with which they are usually associated; the antennæ, caudal apparatus, and more especially the mouth, (and the habits of the animals,) having nothing in common. The very name that Lamarck has imposed on the order is founded in error. They are not *Arachnides antennées trachealcs*, and of this you can easily satisfy yourself; detach the scales from the outside with a sable-brush, divide the insect into two halves by a sharp cut from the head to the tail, and under the microscope, by separating the fleshy interim from the tegument of the bronchi, brilliant silvery unconnected tubes are seen running upwards and forwards from near the posterior margin of each ring, throwing off numerous branches in all directions, *but without the slightest appearance of tracheæ;* the spiracles are excessively minute pores on the lateral parts of the belly, and only to be detected by throwing the light through the plates after the scales have been removed, and tracing down the bronchi to them.

As you have remarked, in your observations in the first volume of the Society's Transactions, Mr. MacLeay considered this tribe as the analogues of the *Orthoptera*, on account of their saltatorial powers; but I believe it has never been remarked how exceedingly closely they are associated with one division of this order, and of these most especially the *Achetidæ*. For instance, the *Orthoptera* are distinguished by their want of *tracheæ;* secondly, compare the caudal appendages, and we find much to strike us of close relationship: then the compound eyes and antennæ, these latter, in both the true *Lepismæ* and *Achetæ*, arising by two naked joints supporting long, setaceous, hairy, multiannular terminations; next the metamorphoses are similar; and, lastly, the trophi formed on precisely the same model. Turn to your sketches and description of *Acheta domestica*, at page 440 of your first volume,* and compare them and it with the following description of the manducatory apparatus of *Lepisma* (fig. 4, head and prosternum):—

Labrum somewhat triangular, rounded at the angles.

Mandibles solid, with four strong, horny, transverse teeth (fig. 5*a*, 5*b*).

Tongue fleshy, filling up the space behind and between the mandibles.

Maxillæ bilobed, the outer galeated, partly protecting the inner lobe and carrying at its base the 5-jointed palpus. The inner shorter and surmounted by two strong incurved teeth (fig. 6),

* Introd. to Mod. Class. of Insects.

Labium 4dri-lobed, the outer triangular, pilose, supporting the 3-jointed palpus, the inner somewhat square (fig. 7).

(Mentum leathery; it seems like a collar closing the aperture of the mouth posteriorly).

In short, it seems to me not unreasonable to imagine that on further investigation these will again be associated with the true insects, the only difficulty being the rudimentary organs thrown out to compensate the want of support afforded by the hind legs, or at least that they will be considered a completely distinct class from the *Myriapods* and be divided into two orders, *Thysanura* and *Podura*. All this however merits consideration and careful examination.

I see that Guérin has figured, under the name of *Podura succincta*, an addition to my subgenus *Orchesilla*. *P. nitida*, *nigro-maculata*, *albo-cincta*, and *grisea*, Fab., must form a new subgenus,* so must my *cingula* and *fuliginosa*; *stagnorum* and *arborea*, Lin., another; *aquatica*, Lin., *fimetaria*, Lin., *ambulans*, Fab., with *dubius* and *muscorum*, another: and I wish the name I gave this last changed from *Achorcutes* to *Rathumoutes*.

I have now to direct your attention to some *Myriapods*. The genus *Cermatia* of Illiger has been to me always a puzzle, but I am at length satisfied of the existence of the following species:— At the Cape I became acquainted with a considerable number of a species of this genus, and I was struck with the constancy with which the relative proportions of the various parts of the body were maintained, and it gave me the clue to the unravelling of the doubts and difficulties I had previously to contend with; some minute characters derived from the dorsal plates likewise gave me assistance. The species I consider distinct are the following:—

I. Those with the body elongate and decidedly increased in breadth about the middle.

Sp. 1. *Cermatia araneoides*.

Julus araneoides, Pallas. Differs from all the others, as far as we can trust to his figure and excessively minute description, in the extreme narrowness of the body and in the equality of length of the antennæ and hind legs, both being nearly one half longer than the body.

Length 1.33 inch., relative proportions of body, antennæ, and hind feet, 1.0, 1.4, 1.4.

* *Ptenura*, with long antennæ of four articulations, the third not longer than the fourth, which distinguishes them from *Pod. plumbea*.

Sp. 2. *Cermatia longicornis.* Hardwick, Lin. Tran. xiv. p. 131.

Resembles the last very much, but has the antennæ shorter and the last pair of legs longer.

Habitat Bengal.

Length 1.25 inch., relative lengths 1.0, 1.2, 1.8.

Sp. 3. *Cermatia nobilis*, mihi. (Pl. XVII. fig. 1—4.)

This giant of the tribe has the head small, sub-ovate, with a narrow black streak passing from the labrum along the edge of the fovea of the antennæ to the inner canthus of the eye; another more diffused from thence to the back of the head; a minute black line mesially imbedded in a brown patch, and with two angular black marks near its middle. Antennæ very long, slender, brown. Body elongate, spindle shaped, being considerably broader about the fourth scutellum, which is nearly square, dilated posteriorly, margin waved and furnished with numerous strong teeth or spines,—in this latter character the rest resemble it; all are pale brown, with a middle yellow line edged with brown, a dark longitudinal fascia on each side, and an obscure transverse one across the base. Legs long, successively lengthening, the last being very attenuated. Coxæ yellowish brown, with a blue annulus near the apex. Femora greenish, with two deep blue annuli. Tibiæ yellow, faintly annulated. Tarsi dark reddish brown.

Habitat Mauritius and India.

Fig. 1. The animal of the natural size.
2. The sixth scutellum and twelfth leg.
3. One of the tarsal annuli.
4. The second auxiliary leg and part of the first on the right behind it.

Length 2.0 inch., relative lengths 1.0, 1.6, 2.0.

Sp. 4. *Cermatia coleoptrata.*

Scutigera coleoptrata, Lam.

Cermatia livida, Leach.

Cermatia ——, Savigny, Egypt, pl. 1, fig. 5.

This I found very common at Gibraltar. It differs from the two first in being much smaller; head more rotund, body more linear, last pair of legs longer, and, from the next species, in the scutella, the fourth being one quarter longer than broad, edges parallel and slightly waved, with longitudinal rows of minute spines, and the

margin with a double row of strong short spines of equal size; the antennæ likewise are shorter.

Habitat South of Europe.

Length 0.8 inch., relative lengths 1.0, 1.2, 2.0.

Pl. XVI. fig. 12. Fourth scutellum of *Cermatia coleoptrata*.
13. Margin of this scutellum exhibiting the spines.

Sp. 5. *Cermatia Capensis*. (Pl. XVI. fig. 8—11.)

Very common at the Cape of Good Hope, (my specimens were hung up in a bottle and all their hind legs became detached, so that I have merely sketched them, but I believe they are of the accurate dimensions). Head smaller in proportion than in the last species, pale yellow, the articulations marked with brown. Body pale yellowish, with a narrow yellow central fascia and a brown dash between it and the side; fourth scutellum sub-ovate, with a row of minute marginal teeth or spines, every fifth or sixth being longer and stronger than the others; the spines on the dorsum of the scutellum nearly obsolete. Legs robust and yellowish, without dark annuli, or extremely faint on the coxæ and femora.

Length 1.0 inch., relative lengths 1.0, 1.7, 1.4?

Pl. XVI. fig. 8. *Cermatia Capensis* a little magnified.
9. Last leg of the sixth scutellum.
10. Fourth scutellum.
11. Edge of the fourth scutellum exhibiting the spines.
Pl. XVII. fig. 5. Magnified portions of the articulations of the joints of the antennæ, and the tip.

II. Body short and of nearly equal breadth.

Sp. 6. *Cermatia longipes*.

Scutigera longipes, Lam.
Scutigera araneoides, Guérin, Iconographie, 1, fig. 7.
—— *Savigny*, Egypt, pl. 1, fig. 6.

Clearly distinguished by the form of the body, shape of the head, shortness of the anterior legs, and the exceeding length of the posterior pair.

Length 1.2 inch., relative lengths 1.0, 1.7, 3.0.

Has not Guérin a joint too many at the base of the antennæ, Icon. 1, fig. 7 *a*?

Note—the relative lengths are successively those of the body, antennæ, and last legs.

I discovered at Trincomalee a most beautiful species of crab allied to *Nephrops*, but distinct in generic characters from it, which I have not yet had time to particularly examine, but you shall have it when I can get leisure to make the necessary sketches. In the mean time, adieu,

Your's, very truly,
R. Templeton.

Colombo.

N.B. It may interest some of your conchological acquaintances to know that *Avicula radiata* of Leach is the far famed pearl oyster of Ceylon; I have got plenty of all ages destined for the Belfast Museum. I send you a sketch of the fry which roves about near the surface of the sea; it in scarcely any respect resembles the full grown shell. Vide Nat. Misc. vol. i. pl. 43.

XLV. *Descriptions of the Species of the Curculionideous Genus* Pachyrhynchus, *Sch., collected by H. Cuming, Esq., in the Philippine Islands.* *By* G. R. Waterhouse, Esq., V.P.E.S.

[Read 1 March, 1841.]

Sp. 1. *Pachyrhynchus venustus*, Waterh.

Niger, lævis; capite maculâ unâ inter oculos; thorace maculis duabus suprà, maculâque unâ ad utrumque marginem, elytris viginti-duabus ovatis ornatis; his e squamis auratis, vel aureo-cupreis, effectis.

Var. β. Differt elytris maculis octodecim ornatis.

Var. γ. Differt elytris maculis sexdecim ornatis.

Long. corp. $10\frac{1}{2}$—$7\frac{3}{4}$ lin., lat. $4\frac{1}{6}$—3 lin.

This is the largest species of *Pachyrhynchus* I am acquainted with: its form is more elongated than that of *P. moniliferus*. The body is black and very glossy; on the legs there is often a slight bluish or purplish tint. The rostrum has an oblong shallow depression, commencing at the base and becoming deeper, and terminating in a transverse line opposite the base of the antennæ; it is very delicately punctured. The thorax is equal in length and width, and less swollen in the middle than in *P. moniliferus;* numerous very minute punctures are observable on the upper surface. The elytra are about one-third broader than the thorax, of an elongate-ovate form, and exhibit neither striæ nor punctures. The metallic spots are disposed as follows:—one between the eyes, and one on each side under the eye; a tolerably large oblong spot on each side of the upper surface of the thorax, and a broad longitudinal mark on the side near the insertion of the legs. On the elytra the number of spots varies from sixteen to twenty-two, and those which I believe to be the males generally have less than the females; in all the specimens there are two spots on the suture, one on the middle of the elytra and one between this and the apex; on the outer margin of each elytron is a large oblong spot at the base, a second behind the middle, and a third extending nearly to the apex—these two last spots sometimes join; at the base of the elytra are two oblong spots placed one on each side and at a short distance from the suture; besides these are four round spots, two on each elytron, situated about midway between the suture and the outer margin and nearly

equidistant from each other and from the foremost sutural spot; between the hindermost pair of the four spots just mentioned are sometimes two other spots, which are either large and oblong or small and round. On the under side of the insect a small spot is observable between the anterior legs; the meso- and meta-sternum have each a spot on either side, and on the base of the abdomen are four spots. The legs have usually a small patch of scales on the under side of the femur near its apex. The abdominal segments are very delicately and indistinctly punctured.

Sp. 2. *Pachyrhynchus rufo-punctatus*, Waterh.*

Niger, lævis; capite maculis tribus; thorace maculis duabus suprà, maculâque unâ ad utrumque marginem; elytris viginti-duabus ornatis, his maculis e squamis rufis effectis.

Long. corp. $8\frac{1}{2}$ lin.

This species approaches most nearly to the *P. venustus*, but differs in being smaller, of a less elongated form, and in having the spots of a red, or pinkish red, colour, and very nearly destitute of metallic lustre. Here the depression, which in *P. venustus* is confined to the upper surface of the rostrum, extends backwards between the eyes, so that in one species the forehead is distinctly concave, whilst in the other it is flat or even slightly convex. The elytra in the female of *P. rufo-punctatus* are shorter than in *P. venustus*, rather less convex and more dilated in the middle. The spots in these two species are disposed in the same manner.

Sp. 3. *Pachyrhynchus gemmatus*, Waterh.

Niger vel cupreus, lævis; capite suprà maculis duabus; thorace suprà tribus, infra duabus, et elytris sexdecim (duabus apud suturam) ornatis; his maculis e congerie squamarum metallicè splendentium effectis; squamis centralibus nitidè viridibus, circumgirantibus aureo-rubris, et indè ocellos efficientibus.

Long. corp. $6\frac{1}{2}$—$8\frac{1}{2}$ lin.

Var. β. Differt elytris maculis viginti-duabus ornatis.

The general colour of this most beautiful insect is sometimes black and sometimes of a most brilliant copper-like hue. The spots are formed of metallic scales of various hues, but generally

* Descriptions of four species of *Pachyrhynchus*, viz. *P. rufo-punctatus*, *P. elegans*, *P. concinnus*, and *P. latifasciatus*, have been added to this paper since it was read in March, 1841. These additional species were brought before the Society in February, 1842, having been discovered in a portion of Mr. Cuming's Philippine Island collection, which had been previously overlooked.

they are golden green in the central portion of each spot, and of a gold or coppery hue on the outer portion. On the rostrum are three of these most brilliant spots, one above and one on each side, and the head has three spots disposed in the same manner. The prothoracic ring presents six spots, three above, of which two are towards the sides and about midway between the base and apex of the thorax, and one is behind in the centre. The elytra have two round spots on the suture, and other spots—sometimes seven on each elytron, and sometimes nine. The meso- and meta-sternum are each adorned with brilliant scales at the sides, and so are the abdominal segments, with the exception of the terminal one. The femora have a subapical ring (generally interrupted above) of brilliant scales. The rostrum has a large and nearly semicircular depression, occupying nearly the whole area of the basal half, and this is more or less confluent, with a largish but shallow fovea situated between the eyes.

Sp. 4. *Pachyrhynchus perpulcher*, Waterh.

Niger, lævis; thorace maculis (subocellatis) suprà quatuor, ad latera duabus, elytris octodecim ornatis; his e squamis metallicè viridibus et cupreis effectis.

Long. corp. 6—6½ lin.

This species somewhat resembles the *P. gemmatus*, being adorned with similar brilliant ocellated spots; it is however of smaller size, has a proportionately larger thorax and the spots are differently disposed. It is at once distinguished from that species by the absence of sutural spots on the elytra, and by having four spots on the upper surface of the thorax instead of three, as in *P. gemmatus*.

Sp. 5. *Pachyrhynchus Cumingii*, Waterh.

Splendidè cupreus; elytris leviter punctato-striatis; rostro notâ transversâ basali, capite maculis oblongis tribus, harum una inter-oculari, una utrinque suboculari; thorace lineis marginalibus, et suprà lineis tribus, et unâ transversâ interruptâ, notato; elytris lineâ marginali, lineisque duabus longitudinalibus dorsalibus, nec non lineâ transversâ per medium excurrente, atque lineis duabus abbreviatis et ad angulos basales, et ad subapicales; his lineis maculisque pallidè cyaneo-viridibus.

Long. corp. 6¾ lin., lat. 3 lin.

This beautiful species is rather larger than *P. moniliferus*; the

rostrum is proportionately broader and rather shorter, the thorax is also broader and rather less constricted before and behind, and the elytra are proportionately narrower and more elongated: it is of a rich copper-red colour, but presents a slight æneous tint in parts and in certain lights. The rostrum is very delicately punctured and has a shallowish transverse impression in a line with the base of the antennæ, there is also a broad and very shallow oblong depression on the head—both these depressions are filled with pale blue-green scales, and there is a patch of similar scales on each side beneath the eye and another on the side of the rostrum. The thorax is smooth, has a transverse blue-green line in front and another behind, and these lines are joined by a broader mark on the sides, which passes close to the femora; on the upper surface are three longitudinal marks, and one central transverse mark; this latter is slightly interrupted, otherwise the disc of the thorax would be divided into four areas. The elytra are faintly punctured, and the punctures form striæ; on the apical portion of the elytra the punctures are more distinct: a line of scales borders the outer margin of each elytron, extending from the base almost to the apex; at the base it is recurved and runs up towards the suture, but stopping at a short distance from the suture it sends off a longitudinal line which extends very nearly to the apex of the elytra and there joins the marginal line; this longitudinal line is slightly interrupted in the middle of the elytra, where there is a transverse band. Besides these lines, all of which are formed of pale blue-green scales, there are two abbreviated longitudinal marks running from the base of the elytra on each side, and two small spots situated on the apical half of each elytron.

Sp. 6. *Pachyrhynchus elegans*, Waterh.

Splendidè cupreus; capite maculis tribus, thorace maculis duabus suprà, maculâque unâ ad utrumque marginem; elytris maculis duodecim ornatis; his maculis magnis et subocellatis, e squamis pallidè viridibus effectis.

Long. corp. $7\frac{1}{4}$ lin., lat. $3\frac{1}{6}$ lin.

This species is considerably larger and more elongated in form than *P. moniliferus*. It is of a brilliant copper colour, and smooth: the forehead and base of the rostrum are concave, and the latter has a deep transverse impression; on the head above is a round spot, and under each eye is an oblong spot. The thorax has two oblique patches above, and a broadish mark on each

side. Elytra impunctate, with four largish spots at the base; in the middle of each elytron is a transverse patch, which joins a second longitudinal patch placed on the outer margin; behind the middle are two sutural spots; and on each elytron is a spot very near the apex, and another close above this: all these spots are formed of scales of a very delicate green colour, those on the elytra however have each a scaleless space in the middle. The sides of the meso- and meta-sternum, and of the two first segments of the abdomen, are adorned with green scales.

Sp. 7. *Pachyrhynchus speciosus,* Waterh.

Splendidè cupreus, vel niger; elytris striato-punctatis; capite lineis tribus longitudinalibus; thorace annulis tribus elongato-ovatis; elytro utroque lineis duabus transversis humeralibus ad maginem elytrorum externum confluentibus et prope suturam; duabus centralibus et ad suturam et ad marginem externum ductis nec non confluentibus; et lineâ aream semilunarem circumdante apicali, ornato, his lineis viridi-squamosis.

Long. corp. $6\frac{1}{2}$ lin.

About equal in size to the *P. moniliferus*. The ground colour is usually like burnished copper, but sometimes black. On the head is a broad and deep impression between the eyes, and this is continuous with the usual excavation on the base of the rostrum. The scales forming the markings are of a very pale green colour, and almost destitute of metallic lustre. The head has three longitudinal marks; one central, and one under each eye. The thorax is most indistinctly punctured, and has three elongated oval rings, of pale scales, placed lengthways, one on each side, and one dorsal, which encloses an area scarcely broader than the encircling line. The elytra are rather more elongate than in *P. moniliferus:* at the base of each elytron is an elongated oval area transversely disposed, enclosed by a narrow band of scales, and extending from the outer margin nearly to the suture; on the apical portion is a curved area similarly inclosed, and besides these markings are two narrow transverse bands, which become confluent near the outer margin of the elytron and run backwards to join the apical curved marks—sometimes the two dorsal bands are joined also at the suture of the elytra. A line of scales on the prosternum nearly encircles the base of the anterior legs: the sides and central portion of the meso-sternum, nearly the whole of the meta-sternum, and the sides of the first, second, third, and

fourth abdominal segments, are adorned with scales. The femora have a subapical ring of similar scales, but it is more or less interrupted on the upper surface of each femur.

Sp. 8. *Pachyrhynchus Schœnherri*, Waterh.

Splendidè cupreus; capite maculis tribus, earum unâ inter-oculari, unâ utrinque suboculari; thorace nitido, dorso binotato, ad latera lineis duabus; elytris octodecim punctis (duabus apud suturam) ornatis; his notis, lineis maculisque pallidè viridibus.

Long. corp. $5\frac{1}{2}$ lin., lat. $2\frac{1}{2}$.

This species is rather less than *P. moniliferus*, and of a narrower form, and so far agrees with *P. Erichsoni:* its thorax however is much less globose, approaching somewhat to a cylindrical form, though it is still swollen in the middle; the legs are decidedly shorter and more slender; the elytra are impunctate, and there are differences in the colouring and markings. The general colour of the insect is brilliant copper-red. The rostrum is very delicately punctured and has a somewhat shallow triangular fovea, the base of which forms a transverse line opposite the insertion of the antennæ; there is a round spot between the eyes, and another on each side beneath the eye, formed of brilliant green scales, as are all the other spots on the insect. The thorax is impunctate, and has a small spot above on each side situated midway between the base and apex, and a second larger spot just above the insertion of the femur. The elytra have eighteen smallish spots; four of these are at the base, one on each side near the outer margin, and one on each side at a short distance from the scutellum—these spots are of an oval form: in the middle of the elytra is a transverse row consisting of six round spots, and a little behind the line of these spots is an oblong spot on each side placed close to the outer margin and one placed on the suture; a second sutural spot is observable near the apex of the elytra, and two others on each side of this, two being placed rather above the line of the last mentioned sutural spot and two below and more near the tip of the elytra.

Sp. 9. *Pachyrhynchus Erichsoni*, Waterh.

Æneus; capite maculis tribus, earum unâ inter-oculari, unâ utrinque suboculari; thoracis dorso binotato, lateribus bima-

culatis; elytris maculis sexdecim ornatis; maculis omnibus flavo-squamosis.

Long. corp. 6 lin., lat. $2\frac{2}{3}$ lin.

This species is about equal in size to *P. moniliferus*, but is of a narrower form, and has the thorax more globose. It may be distinguished from either of the other species by its brass green colour. The head and rostrum are impunctate; a slight central longitudinal groove is observable on the hinder part of the latter, and on each side of this are two shallow oblong foveæ, these and the central groove abut against the distinctly elevated anterior portion of the rostrum; a small golden spot is situated under each eye. The thorax is globose and more distinctly constricted behind than usual; on the upper surface is a smallish round spot on each side situated about midway between the base and apex of the thorax, and there is another on each side just above the base of the femur. On the elytra are sixteen tolerably large round spots, these are nearly equi-distant and disposed as follows:—four form a transverse row at the base of the elytra; near the middle is another band of four spots, and between this and the apex of the elytra is a third band of six spots, and, lastly, there is a spot near the apex of each elytron.

Sp. 10. *Pachyrhynchus Eschscholtzii*, Waterh.

Ater, nitore violaceo; thorace maculis duabus; elytris striato-punctatis, maculis quatuor rotundatis ad basin; sex ad medium, sex prope apicem, duabusque ad apicem, albescentibus.

Long. corp. $6\frac{1}{3}$ lin.

About equal in size to the *P. moniliferus;* but the thorax is broader and rather shorter than in that insect, and the elytra rather more elongated. Rostrum with the basal half flat or slightly concave above and with a longitudinally impressed line, the fore part humped or elevated above the plane of the hinder portion. Thorax impunctate, nearly globose, but truncated before and behind, with two round spots above about midway between the base and apex, and a patch on each side just above the insertion of the leg. Elytra convex, ovate, with rows of distinct punctures. On the elytra are twenty spots, four of which are arranged in a transverse line near the base; six others form a parallel row near the middle of the elytra; this is followed by a band of eight spots; and, lastly, there is a spot on each elytron near the apex. These spots are nearly round and of moderate

size, if we except four, which are small; these are the second from the suture in each of the second and third bands. The scales forming the spots have a slight golden hue, but are very pale.

This species nearly resembles the *P. Erichsoni*, but differs in having the thorax larger and more globose; the eyes are rather larger and less convex, &c.

Sp. 11. *Pachyrhynchus latifasciatus*, Waterh.

Splendidè æneus; thorace fasciâ transversâ; elytris seriatim punctatis, fasciis duabus (in medio interruptis), maculisque tribus ad apicem, ornatis; his fasciis maculisque e squamis viridibus effectis.

Long. corp. 6 lin.

More elongated, and with the thorax larger and more globose than *P. moniliferus*. Rostrum with an impressed longitudinal line on the basal half, and with a large but shallow triangular fovea, the base of which is nearly in a line with the point of insertion of the antennæ; in front of this line the rostrum is humped. Thorax convex and considerably swollen in the middle; smooth, and with a central transverse band which is much dilated on the sides. Elytra ovate, with rows of small punctures; a broad band near the base, and a second near the middle; both these bands are interrupted at the suture, and the second is curved on the side of the elytra and runs backwards along the margin. Beside these bands is an oblong dash on the apical portion of each elytron, near to, and parallel with the suture, and there are moreover two sub-apical spots. All the bands and spots are formed of pale green scales, which have very little metallic lustre.

Sp. 12. *Pachyrhynchus striatus*, Waterh.

Ater; elytris profundè punctato-striatis; capite maculâ inter oculos; thorace suprà trimaculato; elytris duodecim-maculatis; maculis aureis; illis elytrorum ad basin quatuor, et ad apicem quatuor elongatis, ad medium quatuor, scilicet duabus externis rotundatis, et duabus dorsalibus transversis.

Long. corp. 6 lin., lat. $2\frac{2}{3}$ lin.

This species is rather smaller than *P. moniliferus*, and of a narrower form. It is most nearly related to *P. rosco-maculatus*, and very nearly resembles that insect in its markings, but here they are of a golden hue, and instead of the cordiform spot on the

suture there are two transverse spots, one on each side, at a short distance from the suture. The elytra are deeply punctate-striated. On the upper surface of the thorax are three spots, one behind, which is triangular, and one on each side; these last are joined by a narrow subinterrupted transverse line. It is possible this may only be a variety of the *rosco-maculatus;* but the difference in sculpture and size, as well as there being two transverse spots distant from the suture in lieu of the cordiform spot *on* the suture, caused me to separate it. In the present group, however, I have found considerable difference in the sculpturing of specimens of the same species, and the markings in some are subject to extraordinary variations; that is, if I am right in supposing all those insects as varieties of *P. orbifer* which I have given as such.

Sp. 13. *Pachyrhynchus rosco-maculatus*, Waterh.

Niger; elytris distinctè punctato-striatis; capite maculâ inter oculos; thorace suprà trimaculato; elytris undecim-maculatis; his maculis roseis, plerisque oblongis; maculâ unâ suturali obcordatâ.

Long. corp. 6$\frac{1}{3}$ lin., lat. 2$\frac{3}{4}$ lin.

This species is about the same size as *P. moniliferus*, but has the elytra proportionately rather narrower, and much more distinctly punctate-striated. It is readily distinguished from other species described, by the rosy hue and the peculiar form and disposition of the spots and markings. The head has the usual mark between the eyes, and one on each side under the eye. The rostrum is distinctly punctured and has a deep triangular depression, the lower boundary of which terminates in a line with the antennæ. The thorax is impunctate, and has a triangular spot in the middle behind, and a transverse spot about midway between the anterior and posterior margins and running from the sides where it is broadest towards the middle; each spot being pointed on one side and having the point directed towards the centre of the thorax: on each side just above the femur is a broadish longitudinal mark, and a transverse line joins these marks on the under side of the thorax: between the anterior femora is another line. At the base of the elytra are four oblong spots, one on each side, and one on each elytron between them and the suture; on the suture, about midway between the base and apex of the elytra, is a reversed heart-shaped spot, and opposite this (towards the sides of the elytra) is another spot on each side which is nearly

round: near the apex of the elytra are four other large and oblong spots, one on each side close to the outer margin, and one on each side between these and the suture. The elytra are distinctly punctured, and the punctures are disposed in striæ.

Sp. 14. *Pachyrhynchus jugifer*, Waterh.

Ater; capite maculâ viridi inter oculos, et alterâ utrinque sub oculos; thorace in medio lineâ transversâ, et pone hanc lineâ longitudinali a transversâ usque ad marginem posticum thoracis excurrente, his e squamis purpureo-aureis effectis, quibus latera quoque thoracis obtecta sunt; elytris striato-punctatis, squamis purpureo-aureis indutis, areâ majusculâ rotundatâ prope scutellum, et fasciâ transversâ in medio elytrorum, ad latera et ad suturam dilatatâ, nec non lineâ per suturam a fasciâ transversâ ad notam apicalem currente, his notis denudatis

In size and form this species very nearly resembles the *P. moniliferus*. Rostrum separated from the head by a faint transverse impression, with a longitudinally impressed line on the basal half, and with the anterior half (which is moderately punctured) distinctly humped or raised above the plane of the posterior portion. On the head are three spots of golden green scales, one on the vertex, and one under each eye. Thorax but little swollen in the middle, clothed with scales, with the exception of three large and nearly square denuded patches, one on the fore part and two behind; these scaleless areas are separated from each other by narrow interspaces in the form of a transverse band in the middle, composed of green scales, and an oblong, nearly triangular, mark in the centre behind, which is formed of reddish scales. Elytra ovate, convex (less dilated than in *P. moniliferus*), punctate-striated, and clothed with scales which have a pale copper-like hue, exhibiting however but little metallic lustre; not unfrequently they have a purplish tint, and always those which border the denuded patches are more brilliant, assuming sometimes a green and sometimes a golden hue; immediately behind the scutellum is a large round (but occasionally square) denuded area, and rather behind the middle of the elytra is a transverse scaleless mark extending nearly to the sides; the anterior outline of this mark or band forms a gently waved line, but the lower boundary is more or less strongly dentated, it is most dilated in the middle and most contracted by the encroaching of the scales at a short distance on either side of the suture. A narrow black or scaleless

line runs from the transverse mark to the apex of the elytra, the extreme points of which are also scaleless. In some specimens the thorax has the sides, and a small triangular patch on the hinder part above, adorned with scales.

Sp. 15. *Pachyrhynchus phaleratus*, Waterh.

Ater; lineâ transversâ apud thoracis medium, ad utrumque latus in duos ramulos divisâ spatium inæquale circumdantes; pone transversam, lineâ centrali longitudinali; elytris lineâ mediâ transversâ, lineis duabus ad basin longitudinalibus, et pone transversam tribus longitudinalibus; his sic et marginibus externis et basalibus, aureo-viridibus.

Long. corp. 7¾ lin., lat. 3⅔ lin.

This species somewhat resembles the *P. chlorolineatus*, but differs in being much larger; the thorax has a transverse metallic line in the middle, which towards the sides bifurcates, and, joining with a line on the lateral margin, encloses an irregular area: on the hinder half of the thorax above is a longitudinal line, and on the hinder margin is a transverse line: on the thorax beneath is a longitudinal line between the legs, a transverse line behind, and another in front; these, together with that on each side of the thorax, enclose two nearly square areas, and from the middle of each, one of the anterior pair of legs has its origin. The elytra have a transverse metallic line in the middle, and another runs parallel with and close to the outer margin as in *P. chlorolineatus;* there is also a longitudinal line extending from the base of each elytron, near the middle, (but rather nearer the suture than the outer margin,) and extending almost to the central transverse line, as in the species just mentioned; and, on the apical half of the elytra, are two other longitudinal lines, which extend from the central transverse line and join the marginal one near the apex of the elytra, sending off a small branch near the junction of the two; this line does not (as in *P. chlorolineatus*) form as it were a continuation of the longitudinal line on the basal half of the elytra, but is more removed from the suture. Another difference consists in there being a line along the suture on the apical half of the elytra in the present species. I can perceive neither striæ nor punctures on the elytra: the thorax is also smooth, but appears to be slightly indented where the metallic scales form lines. The rostrum is very broad and nearly flat, but there is a tolerably deep transverse indentation

just above the line of the insertion of the antennæ; in this indentation are some metallic scales: the rostrum moreover is very indistinctly punctured.

Sp. 16. *Pachyrhynchus decussatus*, Waterh.

Ater, lineâ transversâ apud thoracis medium et pone hanc lineis tribus longitudinalibus, nec non margine externo aureo-viridibus; elytris, lineâ centrali transversâ, lineis quatuor ad basin longitudinalibus, et pone transversam lineis duabus longitudinalibus, his lineam parvulam incurvam lateralem emittentibus; lineis omnibus sic et marginibus elytrorum splendidè aureo-viridibus.

Long. corp. 7½ lin., lat. 3⅓ lin.

This species approaches most nearly to *P. phaleratus* and *P. chlorolineatus:* it is, however, at once distinguished from the first of these species, by there being no metallic line on the suture of the hinder half of the elytra, and by there being two lines in a longitudinal direction on the basal half of each elytron; the last mentioned character also serves to distinguish it from *P. chlorolineatus;* as well as there being a small curved line branching out of each of the longitudinal lines on the hinder half of the elytra, (which are, as it were, a continuation of the innermost longitudinal line on the base of the elytra,) and three longitudinal lines instead of one on the hinder half of the thorax. On the head is a central longitudinal line of metallic scales situated in a broad groove between the eyes, and a transverse metallic line situated in a deep irregular groove between the antennæ; there is moreover an oblong spot under each eye, and a patch of metallic scales on each side of the rostrum, which is rather distinctly though minutely punctured. The thorax has a transverse line near the middle, which does not extend to the outer margin; a line encircles the thorax in front, but is interrupted in the middle above, and joining this line is a curved longitudinal band on each side of the thorax, and a central mark beneath: on the hinder half of the upper surface of the thorax are three longitudinal lines; all these lines, as well as some spots and markings on the under side of the body, and the lines on the elytra, are formed of brilliant golden scales, having a slight greenish hue. Besides the lines on the elytra before noticed are two small spots, one on each side near the apex. The elytra are very obscurely punctate-striated.

Sp. 17. *Pachyrhynchus concinnus*, Waterh.

Ater; elytris punctato-striatis; thorace in medio lineâ transversâ, et pone hanc lineâ longitudinali; elytris lineâ transversâ centrali, lineis duabus longitudinalibus et lineâ marginali; his lineis pallidè viridibus.

Long. corp. 6—7 lin.

This species closely resembles the *P. chlorolineatus*, but differs in being larger, in having the markings broader than in that insect, and the rows of punctures on the elytra more distinct. The longitudinal marks on the elytra are often interrupted near the transverse mark.

Sp. 18. *Pachyrhynchus multipunctatus*, Waterh.

Ater; capite maculis tribus, earum una interoculari, una utrinque suboculari; thorace nitido, dorso binotato, ad latera lineis duabus; elytris punctis plurimis ornatis; his lineis punctisque viridibus.

This species is equal in size to the *P. moniliferus*, but its form is more elongated. Scarcely a trace of any punctures is observable on the head and thorax. On the elytra are rows of very minute punctures.

Sp. 19. *Pachyrhynchus reticulatus*, Waterh.

Niger; capite lineis tribus longitudinalibus notato; thorace elytrisque lineis aureo-viridibus vel cupreis areas polygonas circumdantibus reticulatè ornatis.

The *P. reticulatus* is equal in size to *P. moniliferus;* its rostrum is narrower, and the thorax is rather shorter, and the elytra less globose. A tolerably broad groove is observable between the eyes, which runs down on to the rostrum, where it terminates, having become gradually broader, in a transverse line at the point of insertion of the antennæ: the fore part of the rostrum is thickly and finely punctured. The thorax is impunctate. The elytra are provided with rows of small but distinct punctures. The markings are all in the form of narrow lines, of brilliant, golden, green, or reddish gold scales. On the head is a longitudinal line above, and another on each side beneath the eye. The upper surface of the thorax is divided into five areas by coloured lines,—two areas in front, which are more or less confluent, two behind, and a small central one; and on each side of the thorax there is moreover a large inclosed area. The elytra have the

metallic lines so disposed that each elytron is divided into nine subequal polygonal areas, besides which there are two areas which are common to the two elytra, one on the suture near the base and the other subapical.

Sp. 20. *Pachyrhynchus rugicollis*, Waterh.

Ater; thorace distinctè rugoso-punctato, punctis squamis viridibus ornatis; elytris rufo-piceis, vel piceis, levitèr punctato-striatis, et ad apicem quasi squamis viridibus pulverulentis.

About equal in size to *P. moniliferus*. The elytra are very globose in this species, usually of a pitchy-red colour, but sometimes nearly black; they have rows of very small punctures. The rostrum has a small but deepish triangular fovea.

Sp. 21. *Pachyrhynchus moniliferus*, Esch.

Sp. 22. *Pachyrhynchus chlorolineatus*, Waterh.

Ater; thorace in medio lineâ transversâ, et pone hanc lineâ longitudinali; elytris lineâ transversâ centrali, lineis duabus longitudinalibus, et lineâ marginali, his viridibus, nonnunquàm splendidè aureo, vel cupreo-viridibus.

Long. corp. 6 lin.

In size and form this species closely resembles the *P. moniliferus;* but upon placing a number of specimens of each side by side, it is evident that the *P. moniliferus* generally has the elytra rather shorter and more globose; some specimens however could not be distinguished in this respect from *P. chlorolineatus*, the markings of which are not broken up into dots. In certain situations all the specimens of *chlorolineatus* had the slender green lines, with which they are adorned, quite destitute of metallic lustre; whilst in other localities the specimens were all marked with brilliant metallic lines, generally of a golden green colour, and sometimes having a coppery hue. I do not find any specimens which perfectly link these varieties; but in *P. orbifer* there is a similar difference in the colouring of specimens from different situations, and there are intermediate varieties.

Sp. 23. *Pachyrhynchus orbifer*, Waterh.

Niger; thorace in medio fasciâ transversâ, et pone hanc plagâ longitudinali a transversâ usque ad marginem posticum thoracis excurrente, his e squamis cæruleo-viridibus effectis;

elytris squamis cæruleo-viridibus indutis, areis 7-rotundatis denudatis.

Long. corp. 6 lin., lat. 3 lin.

In size and form this species closely resembles the *P. moniliferus*. Head and rostrum with distinct scattered punctures, the former with a longitudinal groove above, which runs into a large triangular fovea on the basal half of the rostrum. The scales on these parts are arranged so as to form a line on the head, in fact, there filling up the longitudinal groove; a patch on each side under the eye, and another on each side of the apical half of the rostrum. Thorax subglobose; truncated before and behind, and with very minute punctures, which are rather widely scattered. The uncovered and the scaly parts of the thorax are about equal in proportion: the markings formed by the scales may be described as a broad, transverse, mesial band above,—a central broad mark connecting this with the posterior margin, and a very broad band covering the sides; or, a more accurate idea might perhaps be conveyed by describing the thorax as covered with scales, with the exception of an anterior central patch above,—more or less divided behind by a slender line of scales; sometimes nearly divided into two circles, and sometimes into two squares;—and two quadrate large denuded patches behind. Elytra convex, subovate (generally less inclining to a globose form than in *P. moniliferus*), punctured in striæ, the punctures for the most part distinctly separated; the surface of the elytra is covered with scales, with the exception of two transverse bands, each composed of three round (or nearly round) large denuded areas; the first of these bands is situated near the base of the elytra, and the second rather behind the middle; the three circular areas in each are separated by narrow lines of scales, but between the outermost area of each, and the outer margin of the elytra, there is a considerable space: besides these areas there is a seventh at the apex of the elytra, which is rather small, and generally throws out a short branch on each side, which runs for a short distance along the outer margin of the elytron. All the scales are of a greenish blue colour, but those which are nearest to the denuded spaces are much paler than the rest, and form conspicuous pale lines encircling the scaleless parts. The femora have each two interrupted rings of scales.

Of this species Mr. Cuming brought home an immense number of specimens. There were also in that gentleman's collection many specimens of each of several varieties (or rather what I believe to be varieties) which I will proceed to notice.

Var. *α*. This agrees with the above description, excepting that the scales, instead of being of a dull bluish colour, have a brilliant metallic lustre, chiefly golden green, but intermixed are scales of gold, copper, and azure colours.

Between this variety, and the specimens from which the description is taken, are others which are semi-metallic.

Var. *β*. Differs from var. *α*, in having the denuded areas on the elytra confluent; but the three forming the anterior band are still distinctly separated from the posterior three. The scales on the thorax, moreover, occupy less space than in var. *α*.

In this variety, the denuded spots on the elytra being larger than in var. *α*, they necessarily contract the scaly portion, and this, by a gradual increase of the naked parts, is by degrees contracted (in a series of specimens I have before me) until the elytra might be described as black, with a narrow band of brilliant scales at the base, and running down the outer margin almost to the apex, a second band in the middle, which is also very narrow, and a subapical band interrupted at the suture. The scales on the thorax are here also confined to a narrow mesial transverse line, a very slender longitudinal line connecting this with the hinder margin, and a line on each lateral margin. Again, there are specimens in which the metallic fasciæ on the elytra are extremely narrow, and in parts interrupted; and, lastly, I find individuals in which the central fascia is obliterated, and nearly all the scales from the thorax are wanting.

All these varieties have brilliant metallic scales. There are one or two others which are interesting. One, in which the scales are brilliant metallic green, in which the fasciæ on the elytra, especially the central one (which is moderately broad), are broken up by narrow lines, in the region of the striæ of punctures, into oblong spots. Another like the last, but with the fasciæ narrower and less metallic. Again, in some specimens the scales have less of the metallic lustre, are very narrow and broken up into dots; and among these some have the scales green and others blue; and these last completely run into, as it were, the *P. moniliferus:* and even between *moniliferus* and *P. chlorolineatus* there are intermediate specimens, viz. specimens in which the little bead-like spots, arranged in lines, which characterize the *P. moniliferus*, are less distinctly separated, and almost form uninterrupted lines as in *P. chlorolineatus*. But in cases in which the fascia of the varieties of *P. orbifer* become extremely slender, they are always distinguishable from the *P. chlorolineatus* by these fasciæ being dentated (not even, smooth

lines as in the insect last mentioned), throwing out little processes here and there in situations where, if carried to a greater extent, they would divide the denuded parts of the elytra into the circular areas. Departing from the typical *P. orbifer* in another direction, we find specimens in which nearly all the scales are obliterated, excepting those paler scales which encircle the rounded areas; these varieties approach to the *P. reticulatus*. Lastly, there are specimens in which there are no scales, and as these appendages rub off, it might be presumed these scaleless individuals were old specimens; a supposition which would be correct in some, but not in all, instances. In some of the bottles full of these insects brought home by Mr. Cuming, I found mixed with the *P. orbifer* (and especially with the variety just described as approaching to *P. reticulatus*) numerous specimens in which the scales had evidently been rubbed off—a scale or two only being left here and there; but in one bottle there were a great number of specimens, all of which were *entirely* destitute of scales, and among these were some in which the elytra were quite soft and readily admitted the pin, whilst generally the elytra were so hard that I was obliged to bore a hole with a needle before I could pass the pin through the insect; these black specimens, moreover, nearly always had the elytra more globose and shorter than in *P. orbifer:* on these specimens I founded the *P. inornatus*.

I have said that in *P. orbifer* the elytra have rows of small punctures which are distinctly separated; generally these punctures are more distinct in the specimens from which my chief description is taken; in those with metallic colouring they are less distinct, and sometimes scarcely perceptible: in some of these, however, the punctures are even more distinct than in the type: sometimes the elytra are sulcated, and have punctures in the grooves. I have specimens before me even in which the elytra are deeply sulcated; but these specimens are all more or less crippled, perhaps by some accident while in the pupa state.

From the above observations it will be seen, that there is considerable difficulty in arriving at a satisfactory discrimination of the species of this genus; and as connected with this subject I may mention, that the specimens as they were collected by Mr. Cuming were thrown into bottles of spirit. They were collected in the different islands of the Philippine group, but unfortunately, by an oversight, the labels on the bottles indicating the localities were not attended to when the specimens were mounted. But this much I can affirm, that, generally speaking, those which I have presumed to be varieties of *P. orbifer*, &c., were not mixed

together in the same bottle. There was not *one* of the metallic varieties of *P. orbifer*, for instance, found in a bottle which contained many hundreds of specimens having dull scales, and from which the detailed description is drawn up. Again, the specimens of *P. chlorolineatus* with dull green markings were not mixed with those with marks formed of metallic scales. Those varieties of *orbifer* which approach so near to the *P. moniliferus* were not found mixed up with the hundreds of specimens of that species brought home by Mr. Cuming. I recollect, moreover, perfectly noticing that the varieties of *P. orbifer* having narrow metallic bands were not in the same bottle as those in which the elytra are covered with metallic scales, with the exception of seven circular areas,—in fact, var. *a*.

On the whole I incline to the belief that *P. chlorolineatus*, *P. moniliferus*, and *P. orbifer*, and the intermediate varieties noticed, are distinct races of the same species—varieties produced by some local causes : and this opinion was strengthened by my finding somewhat analogous cases in some other species. After mounting, out of various bottles, a number of specimens of the *Agestrata Luzoniea* (Esch.), all of which were nearly of the same size, I was struck with finding a number of specimens (in a bottle by themselves) which were half as large again as those I had previously pinned. Of the *Pyrgops inops* (Scho.), I found all the specimens in one bottle destitute of any metallic markings, whilst those in another were richly ornamented with golden scales forming spots and bands.

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JOURNAL OF PROCEEDINGS.

(*Continued.*)

June 4th, 1838.

James Francis Stephens, Esq., President, in the Chair.

DONATIONS.

Annales de la Société Entomologique de France, 1837, Part 4. Presented by that Society.

The Magazine of Natural History. New Series, No. 18. By the Editor.

The Naturalist, No. 21. By the Editor.

The Athenæum for May. By the Editor.

Nos. 1 and 2 of the Revue Zoologique. By M. F. E. Guérin.

No. 1 of an Introduction to the Modern Classification of Insects. By J. O. Westwood, F. L. S., Sec. E. S., the Author thereof.

A plate representing the natural history of the Cane-fly, *Delphax Saccharivora*, Westw. By John Wells, Esq., Pres. Agricul. Soc. of Grenada. Presented by J. C. Johnston, Esq.

A Specimen of *Stylops Dalii*, presented by Mr. Thwaites, accompanied by observations upon its habits, in a letter addressed by W. E. Shuckard, Esq.

It was announced that the Society had purchased Curtis's British Entomology.

Busts of Reaumur and Latreille, purchased by the Society, and which had arrived from Paris since the last meeting, were placed as ornaments in the meeting room.

Sir Thomas Phillips, Bart.

Charles Lowe, Esq., of Liverpool, and

Alfred Tulk, Esq., of No. 2, East Brook Place, Dovor,

were elected Ordinary Members of the Society.

Memoirs, Exhibitions, &c.

Mr. Strachan, late resident at Sierra Leone, exhibited several beautiful Coleopterous insects collected at that settlement, including a male of *Goliathus Torquatus* of Drury (another specimen of which is in the Collection of Mr. Joseph Hooker), and which he described as of very great rarity, not having been before noticed by any of the collectors of insects resident there. The specimen had flown into his room by night.

Dr. Cantor exhibited some splendid insects collected by himself in India, including *Fulgora clavata*, West.; an apparently new species of the same genus allied to *F. candelaria*, a large new species of *Mantispa*, several beautiful moths allied to *Gymnautocera*, a new *Macronota* allied to *M. philippinica*, a new *Mimela* and *Campsosternus*, &c.

Mr. Westwood exhibited a living specimen of the rare saw-fly, *Lyda inanita*, captured on the 31st May in his garden at Hammersmith, and stated that for several years he had noticed it on that day, or within a day or two of it. He also exhibited nests made of small portions of rose leaves spirally arranged, found in his garden, and which were formed by the larvæ of a species of *Lyda*, and which he consequently regarded as those of *L. inanita*, no other species occurring there.

He also exhibited a series of drawings illustrative of the natural history of *Nematus Gallicola*, *Balaninus Salicivorus*, and *Eulopeus Nemati*, Westw. (a new species of *Chalcididæ*), the latter being parasitic upon the first-named insect. He also exhibited drawings of various new and remarkable exotic insects, upon which he made various observations. (Since published in the Introduction to Entomology in the Naturalist's Library of Sir W. Jardine.)

Mr. Ingpen stated, in regard to the economy of *Sirex duplex* which he had brought before the Society at the last meeting, that the joists of the house (from which alone the *Sirex* had been produced in immense profusion) were entirely of English timber.

Mr. Shuckard, in communicating the observations of Mr. Thwaites upon *Stylops Dalii*, added that he had recently obtained a species of *Ammophila* from Gambia, which had evidently been infested by a species of *Strepsiptera*, and that on examining an American species of *Rhygchium*, which exhibited the heads of two Strepsipterous insects protruding from between the rings of the body, he had found the interior of the abdomen to be occupied by

the larvæ and perfect insects of a species of *Diptera*, which might probably have been parasitic upon the *Stylops*.

In support of this compound parasitism, the Rev. F. W. Hope stated the circumstances he had observed relative to *Ripiphorus paradoxus*, the parasite of the common wasp, which is itself parasitically attacked by a species of *Anomalon*, which last is the prey of one of the minute *Chalcididæ*.

Mr. Westwood suggested, that as the Dipterous insects found in the abdomen of the wasp by Mr. Shuckard were evidently specimens of a *Trineura*, Meig., in an imperfect state, the supposed larvæ being, in fact, their puparia; these insects, instead of being parasitic on the *Stylops*, must have attacked the wasp after death, it being the habit of some of the *Trineuræ* to reside in ill-preserved collections of natural history, &c.

Mr. Stephens considered it probable that the eggs of the *Trineuræ* were deposited during the process of drying the wasp, as he had noticed a British species of *Libellula* to be attacked by the *Trineuræ* in a similar manner.

The Rev. F. W. Hope communicated a notice of a case from the "Stamford Mercury," in which an old and infirm person had been operated upon for an abscess in the mouth, on opening which a brood of the "common house-clock" were dislodged. The term black-clock being applied in Yorkshire to the larger black species of *Carabidæ*, it was suggested that the insects in question might have belonged to a species of that group, as the *Sphodrus leucopthalus* had been found under nearly similar circumstances. The common cock-roach and the *Blaps mortisaga* were also suggested as possibly being the insects intended.

The commencement of a memoir, entitled *Dytiscidæ Darwinianæ*, by C. C. Babington, Esq., F. L. S., was read.

June 2d, 1838.

James Francis Stephens, Esq., President, in the Chair.

Donations.

Memoires de la Société de Physique et d'Histoire Naturelle de Génevé, Vol. 8, part 1. Presented by that Society,

Die Kafer der Mark-Brandenberg, Vol. 1, part 1. By Dr. Erichson, the Author thereof.

The Athenæum Journal for June. By the Editor.

The Magazine of Natural History. New Series, No. 19. By the Editor.

246 Species of British *Chalcididæ*. By F. Walker, Esq.

M. Charles Aubé of Paris,
Professor Schwaegrichen of Leipzig, and
M. Kunze, also of Leipzig,
were elected Foreign Members of the Society.

Exhibitions, Memoirs, &c.

Mr. Westwood exhibited various insects from the Collection of the Rev. F. W. Hope, presenting several remarkable physiological peculiarities, namely:

A specimen of *Curculio Reidii*, K. (see Plate VI. fig. 3), from between the head and front of the prothorax of which a Dipterous larva had protruded itself, and there died without being able to extricate itself or assume the pupa state; two other smaller dead Dipterous larvæ had also been found within the prothoracic cavity on removing it from the body.

A specimen of a large species of *Acanthocephalus* (family *Coreidæ*), from the scutellum of which a great number of filamentous fungi had been produced, each being as long as the entire body, (see Plate VI. fig. 7, and 7 *a*, part of one of the filaments magnified).

Two specimens of *Euglossa* (family *Apidæ*), from the basal portion of the abdomen of each of which an elongated process had been produced, which was bent backwards and rested on the dorsum of the abdomen; in one of the specimens the appendage was divided at the extremity into two branches (see Plate VI. fig. 1, 1 *a*, the appendage seen from above; 1 *b*, ditto seen sideways); and in the other it was dilated into two reniform lobes (see Plate VI. fig. 2, 2 *a*, the appendage seen from above; 2 *b*, ditto seen sideways). Mr. Westwood considered it most probable that these were vegetable substances in different states of development.

Mr. Evans presented a drawing of the New Zealand caterpillar attacked by *Sphæria Robertsii* (Hooker, Icones Plantar. I. pl. 11), of which he also exhibited a specimen (see Plate VI. fig. 4*). Mr. Westwood stated that he had examined the internal appearance of one of these caterpillars, communicated to him by

* Plate VI. fig. 5, represents the Chinese caterpillar similarly infested by *Clavaria Entomorhiza*, described in the Journal of the Proceedings of the Society for the 1st March, 1841.

Dr. Buckland, and that the interior was filled with a hard dry whitish matter like the kernel of a nut, and that a very slender tortuous black line ran down the centre of the body, and on each side the trachea was observed at some distance from the outside of the body. Dr. Buckland considered that the substance found in the interior of the body of this caterpillar was vegetable, burning with the odour of hay, without any smell of animal matter, being, as he apprehended, analogous to the subterraneous plant (be it stem or root or something between both) which produces for its fruit the common mushroom.

Mr. Westwood also exhibited, from the Collection of Mr. Hope, a large *Lamellicorn* larva from South America, from the pectoral surface of the thoracic segments of which a long and slender curved vegetable production was produced nearly equalling the entire body in length* (see Plate VI. fig. 6.) He also noticed, with reference to the disease to which the house-fly is subject, an original article which had appeared in one of the late numbers of the Athenæum, wherein it was affirmed, from various observations, that the exudation was of an animal nature and the result of plethoric disease, as indeed Kirby and Spense had regarded it. Mr. Yarrell however communicated the following notice drawn up by the Rev. Mr. Berkeley to the opposite effect.

"I have no doubt that the production about which you inquire is *Sporendomena muscæ*, described first by Fries in his Systema Muscologicorum, three years ago; it was most abundant here on flies which attached themselves to the ceiling and there died. You will find it noticed in Engl. Flor., Vol. 5, pl. 2, p. 350. There is also a notice in Loud. Mag. Nat. Hist. Vol. 7, pp. 530, 582; and in Ann. des Sci. Nat. New Series. Vol. 5, p. 316. In the Analysis of Memoirs presented to the Academy of Sciences May, 1836, there is an observation upon it by M. Dumeril, who is right in his view, which was called forth by M. Bassi's account of the analogous complaint which is so injurious to silkworm establishments. There is little doubt the fly is attacked whilst yet living, but the parasite is not fully developed till after death. Other instances are on record of fungi growing upon living animals. You will find some noticed in the article "Dry Rot" in the Penny Cyclopædia. See Jardine's Mag. of Zool. and Bot. Vol. 2, p. 223; and Berkeley's British Fungi, fasc. 3, *Sphæria pedunculata* and *militaris*." [And see Trans. Entomol. Soc. Vol. 2; Journal of Proceedings, p. lxiv. and pl. 20, fig. 2.]

* Mr. G. R. Waterhouse possesses a nearly similar larva attacked by the same or an analogous fungus, but which is branched.

Mr. Westwood exhibited a twig of lilac infested by the larvæ of *Gracillaria Anastomosis* (one of the minute *Tineidæ*), which in the young state mine within the substance of the leaves, but after the first moult they quit the interior of the leaf and become leaf-rollers. The only analogous instance of such variation of habits had been recorded by Mr. Lewis in the first part of the Transactions of this Society.*

The following Memoirs were read:

"Description of a Case of Monstrosity occurring in *Dyticus marginalis*, in which a portion of the external sexual marks of distinction are abortive." By J. O. Westwood, F.L.S.

"Notes on the Habits of the *Strepsiptera*." By G. H. K. Thwaites, Esq., in a letter addressed to J. O. Westwood.

"At the beginning of last month (May) I captured a few bees of the species infested, which were (with scarcely an exception) females and contained *Stylops*, or showed evident signs of a *Stylops* having escaped from them, the latter was generally the case during the third week of the same month; the males made their appearance in some numbers, but few of these Stylopized, and if they were, the *Stylops* was in such an early stage of growth that I could not get one from them, although I kept the bees alive for three weeks. At the beginning of June I again observed the females of the same bee, *but not one of these infested*, so that the Stylopized bees are at least a month earlier than the others; it is therefore quite impossible that the *Stylops*, which appears to live at the utmost eight hours, can lay its egg in the burrow of a bee which does not make its appearance until nearly a month afterwards. Is it not likely that the bees, in most cases, make their cells in the old burrows? And may not the *Stylops* lay its eggs in these burrows before the bee takes possession of it? I can conceive no other possible mode of their introduction.

"The abdomen of the only *Stylops* I extracted alive from a bee was distended to a considerable size with a liquid of a muddy colour, which is discharged very soon afterwards: I have not had another opportunity of observing the same thing."

"Completion of a Monograph on the Genus *Popillia*." By Edward Newman, Esq., F.L.S.

The Rev. F. W. Hope stated that the specimen of *Curculio Reidii* had but recently come into his possession, and that it was

* It is this leaf-rolling larva which is devoured by a species of *Ichneumon*, as described by the late Mr. E. W. Lewis in the Mag. of Nat. Hist., Vol. 6, p. 414.

his opinion that the Dipterous larva had still more recently made its appearance, as he had not observed it at first. Also that when the *Acanthocephalus* first came into his possession, a considerably greater number of the filamentous processes were attached, but some had been accidentally broken off. Also that the *Euglossæ* were portions of a small number of that species, which he had purchased in one lot, several others of which had also been similarly infested, but that he had broken off some of the appendages, thinking these to be bits of yellow wax which had become accidentally attached to the insect. He also mentioned that he had seen a specimen of a *Carabus* in the Vienna Cabinet, which was somewhat analogous to the *Dyticus* described by Mr. Westwood, as well as a *Calosoma*, and that it was his opinion that in such monstrosities there was in general a preponderance of male characters. He had however seen a mackerel which contained both hard and soft roe.

Mr. Yarrell stated that the latter circumstance had been previously observed in fishes, and added that from observations which he had made, it was evident that the external marks of sexual distinction were but of secondary importance, and consequently that when the organs of generation themselves were injured or undeveloped, there was a corresponding weakness or abortion in the external characters. He had observed a female lobster, one side of which was perfect, but on the other side the female organs had collapsed, and the form of the body on that side had assumed the narrowed form of the male body. He had however observed another lobster in which the body was completely gynandromorphous, the organs of generation on one side being of one sex and inducing a corresponding change of external organs, whilst those of the opposite side were of the opposite sex and character.

In allusion to Mr. Thwaites' suggestions as to the mode of oviposition of *Stylops*, Mr. Westwood considered it most improbable that the *Stylops* would deposit its eggs at random in an old and empty cell of an *Andrena*, the latter forming new cells for every brood. And Mr. Shuckard stated, that the different species of *Stylops* parasitic upon different species of *Andrena* probably made their appearance at different times of the year according to the term of appearance of the *Andrena* in the winged state, Mr. Rudd having taken a *Stylops* as late as August or September.

August 6th, 1838.

W. E. Shuckard, Esq., Vice-President, in the Chair.

DONATIONS.

The Journal of the Natural History Society of Boston, Vol. 1, part 4, and vol. 2, part 1. Presented by that Society.

The Honey Bee. Second Edition. By Dr. E. Bevan, M.E.S., &c. By the Author thereof.

Systema Insectorum. Fasciculus 1mus;

Enumeratio Coleopterorum Agri Monacensis; and

Description of *Mesoclastus paradoxus* (*Hypocephalus armatus*, Desm.) All presented by Dr. Johannes Gistl, of Munich, the Author thereof.

Part 3 of an Introduction to the Modern Classification of Insects. By J. O. Westwood, F.L.S.

EXHIBITIONS, MEMOIRS, &c.

Mr. Yarrell exhibited a species of *Callidium variabile*, which he had reared from the larvæ which he had exhibited at the May meeting of the Society, and which had been found in the prepared stems of branches supporting a number of stuffed humming birds in a case by Mr. Leadbeater.

He also communicated a letter from Lady de Grey, of Groby, in which one of the common *Elateridæ* was described as having been observed to inflict an electrical shock which had been felt from the hand to the elbow on suddenly touching the insect.

Mr. S. Stevens exhibited a specimen of *Eryx niger* (one of the *Cistelidæ*), one of the antennæ of which was bifurcated.

Mr. Saunders exhibited a small collection of insects from the Himalaya Mountains, some of which were interesting on account of their resemblance to tropical Indian forms, whilst others were European. Amongst the latter Mr. Shuckard noticed a specimen of *Larra ichneumoniformis*, and the Rev. Mr. Taylor stated that Himalayan specimens of *Papilio Machaon* and *Gonepteryx Rhamni* in the British Museum were identical with European ones. *Vanessa Atalanta* was still more widely extended, but the American specimens, according to Mr. Stephens, constituted a different species, distinguished by a minute white speck on the fore wings.

Mr. Bowerbank exhibited a living specimen of *Cermatia* —? found in the London Docks in a Ceylon ship; its movements were exceedingly rapid, and it had been fed for some time upon

bread soaked in water. It was observed that upon a noise made, it drew itself up, and held up one of its legs in the direction of the noise. These limbs appeared to be but very slightly attached to the body, as the insect had jerked off several, apparently in one instance without cause.

Mr. Sells stated that the real cochineal insect had been raised during the past and present summers in the hothouses of King Leopold at Claremont. Mr. Westwood stated that it had also been introduced into the stoves at the Jardin des Plantes, by M. V. Audouin, and that fifty years ago its introduction into India was attempted, a garden having been expressly formed for its growth, of which a drawing is preserved in the British Museum. Mr. Anderson of Madras was the projector of this attempt; and Donovan states that ten species of *Coccus* had been introduced. Mr. Saunders stated that the failure of this attempt was owing to the employment of a species of *Cactus*, very closely allied to, but specifically distinct from the true *Cactus Coccinellifer*, which would alone support the true cochineal insect.

Mr. Holme communicated specimens of *Anobium paniceum*, taken from the Arabic manuscripts in the Cambridge Library, brought from Cairo by Burckhardt, to which they had done considerable injury.

Mr. Westwood communicated a letter addressed to him by Dr. Hairby, giving an account of the capture of *Cantharis vesicatoria*, in immense profusion in Suffolk, and which was found upon experiment to be equally efficacious with the exotic specimens.

He also communicated an extract from a letter which he had received from Dr. T. W. Harris, of Boston, U. S., strongly urging the propriety of the adoption of a fixed set of rules regulating zoological nomenclature.

A letter was also read from W. Spence, Esq., F. L. S., H. M. E. S., &c., relative to the destruction of the apple crop during the present season, which was chiefly attributable to the attacks of *Aphides* before the flowers had expanded. Mr. Westwood stated that he had particularly observed the destruction of the apple crop at Hammersmith, some of the trees in his garden not having a single apple left on them. In the spring, however, he had not observed any peculiar increase of the *Aphides*, and in many cases the unopened bloom had fallen without any attacks of insects. At a later period he had observed the inside of the fruit infested by the larvæ of a species of *Tenthredinidæ*, a peculiarity hitherto unnoticed in the economy of that family. The Rev. H. S. Taylor

believed that the failure of the flower-buds had in some parts been attributed to the heavy fall of rain and continued cold in the spring, which prevented the impregnation of the flowers; and Mr. Saunders stated that it was well known in Britany that such was one of the chief causes of the destruction of the crop. Mr. Ingpen also suggested, that as in the preceding year there was a superabundant apple crop, the barrenness of the trees in the present season might be expected.

Mr. Holme stated that he had captured *Onthophagus Taurus* in copulâ in the garden of Corpus Christi College, Oxford.

Mr. F. Smith stated that during a recent excursion in Colney Hatch Wood, he had captured many specimens of *Saperda populnea;* and that on examining the underside of one of them, he distinctly saw a specimen of *Megarthrus* — ? (a small *Staphylinidæ*) emerge from between two of the abdominal segments, and that on examining some of the pill boxes in which he had placed the *Saperdæ*, he found two other specimens of the *Megarthrus*.

The Rev. H. S. Taylor noticed the distinctions existing between the Swedish specimens of *Chrysomela sanguinolenta*, Linn., and the insects known under that name in England, which he considered as specifically distinct, although Fabricius and other subsequent writers had given the Linnæan name to them, and had altered the specific character in order to make it accord with the latter individuals.

He also stated that two specimens of *Venilia 4-maculata* had been recently captured at Hampstead, one of which, having evanescent markings, it appeared to Mr. Stephens and himself that that very rare species, as it had been considered, was only a variety of *Venilia macularia*.

September 3rd, 1838.

G. R. Waterhouse, Esq., in the Chair.

Donations.

L'Institut, Vol. 3. Presented by M. Arnault, the Editor thereof.

The Athenæum Journal for August. By the Editor.

Die Aderflugler Deutchslands, 1ster Band. Presented by Dr. Theodor Hartig, the Author thereof.

Annales de la Société Entomologique de France, 1838, Livraison 1. Presented by that Society.

The Magazine of Natural History. New Series, No. 21. Presented by the Editor.

Enumeration des Buprestides, de la Collection de M. le Comte de Mannerheim;

Memoire sur un Nouveau Genre de Coleopterès de Mozambique;

Observations Critiques sur quelques Ouvrages Entomologiques; and

Revue Critique des quelques Ouvrages recemment parus. All presented by M. le Comte de Mannerheim, For. M.E.S., the Author thereof.

Exhibitions, Memoirs, &c.

Mr. Westwood exhibited a specimen of *Claviger foveolatus*, captured by himself in the nest of *Formica flava* in Wychwode Forest, Oxfordshire, at the end of the preceding month.

He also exhibited specimens of *Calandra granaria*, two species of *Latridius*, a *Silvanus*, and *Cryptophagus*, together with *Tinea granella*, all of which attack barley in granaries; and made some observations on the larva of *Cal. granaria*, which differs from *Cal. Sommeri*, Burm., in having the extremity of the body entire and fleshy.

He also exhibited various nests of bees and wasps in different states of progress.

Mr. Waterhouse made some observations on the mode adopted by bees in the construction of the cells, in opposition to the theory of some authors, that the cells are hexagonal in consequence of the pressure of cylinders against each other; whereas Mr. Waterhouse considered that the bees naturally work in circles; but as the cells approached each other, the bees were compelled to form the sides of the cells straight. This was sometimes very clearly shown in the cells at the edge of a comb, the inner sides of which would be angular, but the *free sides round*.

Mr. Bowerbank noticed a similar power of adaptation in the shell of an *Ostræa plana*, attached to a *Mytilus*.

Mr. Westwood read a memoir on the modifications of form to which the typical organs of the *Diptera* are subject.

October 1*st*, 1838.

J. F. Stephens, Esq., President, in the Chair.

Donations.

Introduction to the Modern Classification of Insects, No. 6 By J. O. Westwood, the Author thereof.

The Athenæum for September. By the Editor.

The Magazine of Natural History. New Series, No. 22. By the Editor.

Mr. Tulk exhibited a specimen of the house fly, found on a leaf near Dovor, completely invested with a fungus-like matter of a white colour, the underside having the appearance of mould, and the upper appearing to have an oily surface.

The Rev. Mr. Taylor presented specimens of the different sexes of a *Vespa*, inhabiting a large underground nest near trees, together with specimens of *Ripiphorus paradoxus*, ♂ and ♀, which had made their escape from the small workers' cells; he also exhibited the pupa of this beetle.

Mr. Waterhouse entered into some further details relative to his views of the hexagonal form of the cells of the hive bee, which he considered did not result from the pressure of cylinders against each other; on the contrary, he regarded the queen's cell as proving that a cylinder was the normal form of the cells, the diameter of which was greater than as they appeared under their hexagonal form; hence, as the bees commenced these cells close together, the circumference of one cell would naturally intersect the circumference of the adjacent cells, and hence, in order to prevent the running of the cells into each other, the bees cut away the wax, and left only a straight partition wall. He considered that this was proved by the many exceptions he had observed to the hexagonal form of cells, some being pentagonal, others quadrangular, and others *circular on one side, not adjacent to other cells,* and angular on the opposite side. He had even seen a comb which had been begun in a manner which prevented the cells from receiving a hexagonal form, and the consequence was that the irregularity was kept up throughout the comb.

Mr. Sells however objected that the ordinary form of the queen's cell was not cylindrical, but that of a Florence flask considerably truncated. In the wasps, moreover, there are no cylindrical queens' cells to serve as models.

Mr. Shuckard also considered that it would be necessary for the support of Mr. Waterhouse's theory, that the bee working in its cell did not touch some of the sides at a time when the bees working at the cells adjacent to those sides were absent. Mr. Ashton suggested that the hexagonal form of the eyes of insects confirmed in some degree Mr. Waterhouse's views.

The following Memoirs were read:—

"Note on the Egg Cases of the *Blattæ*." By W. Sells, Esq.

"A few Words in reply to Mr. M'Leay's Remarks on the Metamorphosis of the *Crustacea*." By J. O. Westwood.

"Further Observations on the Habits of the *Œstridæ*. By W. Sells, Esq.

November 5th, 1838.

J. F. Stephens, Esq., President, in the Chair.

The following additions were made to the by-laws, after Chapter 18:—

18*. *Corresponding Members.*

1. The corresponding members of the Society shall consist of such persons, not resident in the united kingdom, as may show a willingness to promote the objects of the Society, and who shall be recommended and elected in like manner as honorary and foreign members.

2. That the numbers of corresponding members shall be unlimited; and that their privileges as corresponding members shall cease in case they should at any time subsequently become permanently resident in this country.

And by way of addition to the 13th chapter of the by-laws relative to the election of members,—

That it shall be imperative on every newly elected English member to pay his entrance fee and subscription for the current year, and to be presented in due form to the president, at the general meeting of the Society, upon his first appearance after the election, whereupon he shall sign the signature-book of the Society.

Donations.

The Magazine of Natural History. New Series, No. 23. By the Editor.

The Athenæum for October. By the Editor.

The Annual Report of the Leeds Philosophical and Literary Society. By that Society.

No. 7 of an Introduction to the Modern Classification of Insects. By J. O. Westwood.

G. H. K. Thwaites, Esq., of Bristol, was elected an Ordinary Member of the Society.

George Newport, Esq., the Author of the successful Prize Essay upon the *Athalia centifoliæ* being present, the President announced to him that the prize of ten guineas offered by the Society, and by the Saffron Walden Agricultural Association, had been awarded to him, which he thereupon presented to him.

Exhibitions, Memoirs, &c.

Mr. Sells communicated the following passage from a review of the works of Buffon, in the Edinburgh Review for June, 1822, relative to the construction of the cells of the bee, which appeared to have anticipated Mr. Waterhouse's theory,

"A cell which one bee would make round, becomes hexagonal by the mutual collision of seven."

Mr. S. Stevens exhibited living specimens of a small spider, and a large *Lepisma* found in a box of seeds from Java; also a specimen of *Catocala Fraxini*, taken near Arundel in October.

Mr. Newport exhibited some cases in which *Copris lunaris* is reared, and stated that he was able to assert that they had been made by the parent insect, and not by the larva as had been suggested.

The following Memoirs were read:—

"Notice of recent Entomological Captures." By Frederick Holme, Esq., M.A.

"Observations on the Construction of the Cocoon of the Goat Moth, and on the Casting of the Coats of the Internal Organs by Caterpillars during Moulting." By Robert J. Ashton, Esq., F.L.S.

Mr. Newport confirmed Mr. Ashton's statement of the trachea,

colon, and œsophagus being cast; he had, however, noticed the remarkable circumstance that the mucous lining of the true ventriculus was not cast off with the rest, but was discharged with the fecula. Mr. Sells also observed that in the *Crustacea* the lining of the stomach was also cast at the period of moulting.

December 3rd, 1838.

G. R. Waterhouse, Esq., in the Chair.

Donations.

Transactions of the Zoological Society, Vol. 2, part 2; and Proceedings of the Zoological Society, October, 1837—July, 1838. Presented by that Society.

Annales de la Société Entomologique de France, 1838, Part 2. Presented by that Society.

Réaumur, Mémoires pour servir à l'Histoire des Insectes. 6 vols. 4to.

Carus, Entdeckung eines Einfachen vom Herzen aus Beschleunigten Blutkreislaufes in den Larven Netzfluglicher Insecten. Leipz. 1827.

Sprengel, Commentarius de Partibus quibus Insecta Spiritus ducunt;

Berendt, Die Insecten in Bernstein;

Burmeister, Beitrage zur Naturgeschichte der Rankenfusser;

Burmeister, Handbuch der Entomologie, Vol. 1. All presented by Francis Walker, Esq., F.L.S., &c.

Zeitschrift für die Entomologie, Part 1. By Dr. Germar, the Editor thereof.

The Magazine of Natural History. New Series, No. 24. By the Editor.

The Athenæum for November. By the Editor.

Part 8 of an Introduction to the Modern Classification of Insects; and

Observations on the Genus *Cerapterus*. Both presented by J. O. Westwood, the Author thereof.

W. Spry, Esq., was elected an Ordinary Member of the Society.

Exhibitions, Memoirs, &c.

Mr. Westwood exhibited a new British species of *Epipone* (*E. melanocephala*, Gmel.), communicated by Mr. Thwaites.

Mr. Bagster exhibited a twig of a greenhouse plant, the leaves of which were discoloured by the punctures of a minute insect, which had also spun a web on the underside of the leaf. (*Acarus telarius*?)

The following Memoirs were read:—

"Description of a Minute Species of Insect which inhabits the Common English Sponge (*Spongilla fluviatilis*)." By J. O. Westwood, F.L.S.

"Descriptions of new Exotic Species of Heteropterous *Hemiptera*. By Mr. A. White.

January 7th, 1839.

J. F. Stephens, Esq., President, in the Chair.

Donations.

Bulletin de la Société Impériale des Naturalistes de Moscou, Nos. 7 & 8 of 1837, and Nos. 1, 2 & 3 of 1838. By that Society.

Annual Report of the Berwickshire Naturalists' Club for 1838. By that Society.

Genera Insectorum, Nos. 1 & 2; and

Handbuch der Entomologie, Vol. 2, part 2. Both presented by Dr. H. Burmeister, For. M.E.S., the Author thereof.

The Magazine of Natural History. New Series, No. 25. By the Editor.

Francis Bailey, Esq., Vice President and Treasurer R. S., &c.,

Captain Ducane, of Southampton, and

C. Lamb, Esq., of Beaufort, near Hastings,

were ballotted for, and elected Ordinary Members of the Society.

Exhibitions, Memoirs, &c.

Mr. Waterhouse exhibited portions of a very large wasp's nest from Ceylon, recently presented to the Zoological Society, being seven or eight feet long, and two feet in diameter, with the view

to show that the construction of the cells of the wasp was perfectly analogous to those of the hive bee. In order to prove the great tendency that these cells have when unconnected with each other to assume a circular outline (which he contended was the normal form of all cells), one piece of comb was produced which had been found in a detached situation consisting of three cells, of which the outer part of each was circular, whilst the portions which existed between the three formed three straight walls. He considered that the wasps never make a single cell at the commencement of the comb, but proceed very slowly, forming the bases of several together, whereby they assume the hexagonal shape, which would not be the case if they built a single cell, which would be circular; and he instanced the case of the single cells of *Osmia atricapilla* in proof of such argument.

Mr. Ingpen exhibited some cocoons of the common silkworm, from which the moths had escaped without staining the cocoon, by the emission of the meconium-like fluid, which had been supposed to have the effect of dissolving the threads of the silk. Mr. Waterhouse considered it questionable whether some dissolving fluid had not been emitted in these instances from the mouth, which he thought had the same effect, although colourless, the fluid emitted from the anus staining the cocoon.

Mr. Bainbridge, on behalf of H. Le Keux, Esq., exhibited one of the *Ichneumonidæ* (*Campoplex*?), together with the pendulous cocoon from which it had been produced, and in which it had remained for eighteen months before appearing in the winged state.

Mr. W. W. Saunders exhibited an apparently new species of *Embia* from India; also a specimen of *Goerius olens*, found drowned in water, from the inosculations of the segments of which a great multitude of minute slender white fungi had been produced.

January 28th, 1839, *Anniversary Meeting.*

J. F. Stephens, Esq. President, in the Chair.

In pursuance of the By-laws, the four following gentlemen were removed from the Council:

J. S. Bowerbank, Esq.	C. Darwin, Esq.
J. G. Children, Esq.	F. Walker, Esq.

and the four following gentlemen were elected in their stead:

T. Horsfield, Esq., M.D.	G. Newport, Esq.
T. Marshall, Esq.	J. Walton, Esq.

And the following gentlemen were elected Officers for the ensuing year:

The Rev. F. W. Hope.....*President.*
W. Yarrell, Esq. .....*Treasurer.*
J. O. Westwood .....*Secretary.*
Messrs. Shuckard and Westwood..*Curators.*

Mr. Yarrell, on behalf of the auditors of the treasurer's accounts, read an abstract thereof.

The President then read his annual address upon the state of the Society, its views, progress, and prospects, whereupon a vote of thanks was passed to him for the same.

February 4th, 1839.

The Rev. F. W. Hope, President, in the Chair.

Donations.

Monographia Chalciditum. By Francis Walker, Esq. the Author thereof.

The Magazine of Natural History, New Series, No. 26. By the Editor.

The Entomological Magazine, No. 25. By the Editor.

No. 10, of an Introduction to the Modern Classification of Insects. By J. O. Westwood, the Author thereof.

A large Collection of Insects from North America. Presented by Mr. Smith.

Sir Robert Kerr Porter, Baronet, resident in South America,
Mr. Ezra Downes, resident in the Himalayan Mountains, and
John Newman Tweedy, Esq. Swedish and Norwegian Vice-Consul in Hayti,

were elected Corresponding Members of the Society.

The President nominated the three following gentlemen to act as Vice-Presidents:

T. Horsfield, Esq, M.D.
George Newport, Esq.
G. R. Waterhouse, Esq.

Exhibitions, Memoirs, &c.

The Rev. F. W. Hope exhibited a few exotic *Coleoptera*, forwarded to him by Dr. Burmeister, including a second species of his genus Phænomeris (*Eupyga Beseckii*, Mann.), from Mozambique.

He also made some observations upon the nests of a species of *Termes*, forwarded to the Society by Mr. Schomburgk, from Demerara, together with specimens of the inhabitants thereof, and of a *Solpuga*, which was parasitic in the nest. He also mentioned that the nests of *Termes*, owing to their compactness, were described by several travellers as being used as ovens for baking food. This was the case in Caffraria and in Ceylon, and he also believed in New Holland, as mentioned in Bennett's work on that country. He also considered it most probable that the Chunam floors in India were composed of powdered *Termes* nests.

Mr. Hope also made some observations upon a piece of fossil wood, exhibiting the operations of insects brought from India by Dr. Cantor, who communicated the following remarks to the Society. "The fossil wood was procured by Mr. H. M. Low at Camillah, in the Decca district, and brought by this gentleman with another piece of fossil wood (also Dicotylidinous), to Calcutta. Both were found in the same locality; the one before the Society is siliceous, and bears marks of insects; the other, apparently calcareous, has been perforated by a kind of *Teredo;* the traces of which agree with those I have observed in the trees of the Gangetic Delta, formed by *Teredo navalis*. Mr. Mac Clelland has referred to these two fossils in his Reports upon the Coal and Mineral resources of India, p. 29, note."

Mr. Thwaites exhibited a small collection of insects, obtained

by Mr. Raddon and himself, from Indian corn imported to Bristol in a vessel arrived from Bonny, on the coast of Africa, including a species of *Sylvanus*, *Murmidius ferrugineus*, Leach; a species of *Trogosita*, apparently identical with *T. mauritanica*, which fed upon the receptacle of the wheat, and not upon the grain itself; species of *Cucujus* and *Cossonus*, which devoured the seeds; together with several minute Hymenopterous parasites, belonging to the families *Chalcididæ* and *Proctotrupidæ*.

Mr. Westwood exhibited specimens of two British species of *Tephritis*, *T. Onopordinis* and *Artemesiæ*, the larvæ of which are subcutaneous in the leaves of *Chrysanthemum* and Celery plants, which latter are often greatly injured by the attacks of these insects. (See Loudon's Gardener's Magazine, March, 1839, for a memoir and figures of those two insects.)

The following memoirs were read:

"Notes upon the voracity of the Larvæ of *Dyticus marginalis*." By A. Tulk, Esq.

"Notes upon the Habits of a Colony of *Polistes gallica*, imported into this country from France." By J. O. Westwood.

March 4th, 1839.

The Rev. F. W. Hope, President, in the Chair.

Donations.

The Coleopterist's Manual, Part 2. By the Rev. F. W. Hope, the Author thereof.

The Magazine of Natural History, New Series, for March. By the Editor.

The Athenæum, for February. By the Editor.

Parts 9 and 11 of an Introduction to the Modern Classification of Insects. By J. O. Westwood, the Author thereof.

A large Collection of British *Coleoptera*. By S. Stevens, Esq.

Exhibitions, Donations, &c.

Notes relating to Bees and Bee husbandry. By W. Sells, Esq.

Mr. Ashton, in reference to the double sides of the cells of the hive bee, noticed the analogy between these cells and the hexagonal cells of the cellular tissue of vegetables, physiologists having

discovered that each cell has its own proper walls. Mr. Newport also stated that he had observed cells of wasps, which exhibited similar double walls. Mr. Waterhouse stated that the cells in question, described by Mr. Sells, were old cells, the separate lining of which was composed of the cocoon of the larvæ previously reared therein. This was proved by immersing the cells in warm water, when it would be found that the wax would be melted, leaving the cocoon part of the cells entire.

A conversation took place relative to the appointment of a Committee, as suggested by Mr. Sells, to superintend the publication of a tract, for distribution among cottagers, containing the most approved modes of bee-culture.

April 1*st*, 1839.

The Rev. F. W. Hope, President, in the Chair.

Donations.

Philosophical Transactions of the Royal Society, 1837, Parts 1 and 2, and 1838, Parts 1 and 2;

List of Fellows of the Royal Society for 1838;

Proceedings of the Royal Society, November, 1837—December, 1838; and

Address of H. R. H. the Duke of Sussex, President of the Royal Society, read 30th November, 1838. All presented by the Royal Society.

Nouveaux Mémoires de l'Académie Royale des Sciences et Belles Lettres de Bruxelles, Tom. xi. 1838.

Bulletins de l'Académie Royale de Bruxelles, Ann. 1838, Tom. v.

Annuaire de l'Académie Royale de Bruxelles, Cinquième Année. All presented by that Academy.

Monographie des Braconides de la Belgique; Suite; and

Monographie des Odyneres de la Belgique et Suite. Presented by M. Wesmael, the Author thereof.

The Athenæum for March. Presented by the Editor.

The Magazine of Natural History, New Series, No. 25. By the Editor.

J. Strachan, Esq. of Sierra Leone, and
Adam White, Esq. Assistant in the Natural History Department at the British Museum,
were elected Ordinary Members of the Society; and

John M'Clelland, Esq. of the Bengal Medical Service,
William Griffith, Esq. of the Madras Medical Service,
Dr. Schomburgk, of Demerara, and
Robert Templeton, Esq. of the Royal Artillery, now resident in Ceylon,
were elected Corresponding Members of the Society.

The Rev. F. W. Hope exhibited specimens of *Chiroscelis digitata*, Fab., and other insects, recently obtained by him from Sierra Leone.

Mr. Raddon exhibited some specimens of insects imbedded in Gum Copal; likewise some photogenic drawings of plants, &c. and pointed out the advantage of employing this mode of delineating the veins of the wings, &c. of insects. Also some fir cones attacked by a species of *Cecidomyia*.

Mr. Raddon also presented two proofs of the portraits of W. Spence and J. G. Children, Esqs. recently engraved by him.

The following memoirs were read:

"Some Remarks on Wire Worms which seriously damaged the Potatoe Crops in 1838." By the Rev. F. W. Hope.

"On the Habits and Structure of the Nests of gregarious *Hymenoptera*, particularly those of the hive Bee and Hornet." By George Newport, Esq., which led to an extended discussion.

"Sketch of an arrangement of a Cabinet of Insects, illustrating their economy and structural peculiarities." By W. Sells, Esq.

May 6th, 1839.

The Rev. F. W. Hope, President, in the Chair.

Donations.

Observations on the Lamellicorn Beetles (from the Magazine of Natural History). By the Rev. F. W. Hope.

Part 1 of the Proceedings of the Botanical Society of London. By that Society.

The Athenæum, for April. By the Editor.

Genera Insectorum, No. 3. By Dr. Burmeister, the Author thereof.

Hymenoptera Britannica (*Alysia* and *Oxyura*.) By A. H. Haliday, Esq. the Author thereof.

The Magazine of Natural History, New Series, No. 29. By the Editor.

No. 12 of an Introduction to the Modern Classification of Insects. By J. O. Westwood, the Author thereof.

Zeitschrift für die Entomologie, Vol. 1, part 1. By Dr. Germar, the Editor thereof.

Twelve Numbers of the Naturalist. By the Editor.

Various specimens of Macrourous *Crustacea* in spirits. By S. S. Saunders, Esq.

Exhibitions, Memoirs, &c.

Mr. Yarrell exhibited a large and hairy caterpillar, evidently one of the *Lepidoptera*, picked up in South America by Captain Blakeney, R. N., who felt, upon touching it, a sensation extending up his arm similar to an electric shock, of such force that he lost the use of the arm for a time, and his medical attendant considered that his life was for some time in danger.

Mr. Hope exhibited a foreign Heteromerous beetle, which had been in his cabinet four or five years, from the extremity of the body of which a *Filaria*, still living, had very recently protruded itself.

Mr. Shipster exhibited some photogenic drawings made from engravings of insects; one of the plates of *Paussidæ*, in the Society's Transactions, being very vividly reproduced.

Mr. Raddon also exhibited some photogenic drawings of insects, both of the natural size, and magnified by the solar microscope. He also exhibited specimens of *Goliathus Drurii*, Westw. ♂, and *G. regius*, Klug. ♀; the latter taken on the west coast of Africa at 5° north lat. near the island of St. Andrews.

He also exhibited specimens of one of the minute *Tipulidæ*, reared from the gall upon fir-cones, exhibited at the last meeting, with various species of parasites; and likewise the net-like cocoon of *Cerostoma porrectella*, one of the *Tineidæ*, the larvæ of which feeds upon the Garden Rocket.

The President read an extract from a letter from —— Strachan, Esq. at Sierra Leone, announcing the capture of another specimen of *Goliathus* (*Eudicella*) *Morgani*, White.

The following memoirs were read:

"Description of a minute Strepsipterous Insect, found in Ireland." By R. Templeton, Esq. R.A.

"Some Remarks on the Entomophagous Tribes of the Australian Alps." By Dr. John Lhotzky.

"Extract from an unpublished manuscript by H. K. Sayers, Esq. Lieutenant 31st Regiment, relative to the Edible Insects of the Western coast of Africa." Communicated by the Rev. F. W. Hope.

Mr. Ogilby, in allusion to Dr. Lhotzky's paper, stated, that the circumstance of a tribe of Australian aborigines being accustomed to feed upon a species of moth at a fixed period of the year, had been long well known; and he added, that its provincial name (which, as well as a description of the insect, had not been given by Dr. Lhotzky) was *Bugong*; and that Mr. George Bennett had given a detailed account of the insect, and the mode in which it was collected and cooked by the natives, in his Wanderings in New South Wales. London, 1824, Vol. 1, p. 266—272, (quoted in the Entomological Magazine, Vol. 3, p. 212).

The President also stated that the moth in question had been formed by M'Leay in the genus *Nycterobius*.

The President also communicated some extracts from Boteler's Voyage (1835, vol. 2, p. 474), relative to the attacks of cockroaches, whereupon Lieutenant Sayers stated that whilst at the Bahamas, the flesh of his own fingers had been eaten down to the quick during the night by those insects, and a brother officer had his feet so severely bitten by them, that he was laid up for some time. They do not, however, appear to attack Russia leather, but will gnaw common leather and books, especially in places where they have been in contact with the naked hands. Mr. Raddon also mentioned a similar instance of the attacks of these insects on the feet of sailors: they had also eaten their clothes. He stated that fowls will greedily devour them.

June 3rd, 1839.

The Rev. W. Kirby, M.A., F.R.S., Hon. President, in the Chair.

Donations.

Part 1 of The English Agricultural Society. Presented by that Society.

The Magazine of Natural History, New Series, No. 30. By the Editor.

The Athenæum for May. By the Editor.

Part 13 of Introduction to the Modern Classification of Insects. By J. O. Westwood, the Author thereof.

Part 1 of the Elements of British Coleoptera. By W. E. Shuckard, Esq. the Author thereof.

Nos. 1 and 2 of British Coleoptera delineated. Presented by Messrs. Spry and Shuckard.

Sir William Sarsfield Rossiter Cockburn, Bart.,
Dr. Kidd, Reg. Prof. of Botany, Oxford,
Mr. Edward Doubleday, of Epping, and
Mr. William Masters, jun. of Canterbury,
were balloted for, and elected Ordinary Members of the Society.

Exhibitions, Memoirs.

The Rev. F. W. Hope stated that having violently struck down some worm-eaten carved wood with a hammer, a vast number of the *Anobia* shortly afterwards made their appearance, whence he considered this to be an excellent method of collecting these injurious insects for destruction.

Mr. Saunders exhibited a very large Prionideous larva, found by himself in Albania.

Mr. Fennell presented specimens of an *Ixodes*, found upon a tortoise.

Mr. Westwood exhibited specimens of *Tenthredo testudinea*, Klug, the females of which he had recently captured, whilst hovering over and ovipositing in apple blossoms. In the preceding year the apple crop had almost entirely failed owing to the attacks of this insect, the larvæ feeding in the interior of the young fruit.

Mr. Hope stated that he had received from Shropshire specimens of a caterpillar which destroys the apple blossom, five or six being found in a single flower.

The following memoirs were read:

"Experiments on old Honey Combs." By W. Sells, Esq.

"Some Account of the preparatory Stages of *Xiphydria dromidarius*, with Observations on its Affinities." By J. O. Westwood, F. L. S.

"Descriptions of some Species of *Bolbocerus*, from New Hol-

land, in the collection of the Rev. F. W. Hope." By Mr. W. Bainbridge.

In reference to the last memoir, Mr. Hope remarked upon the singularity of such large Coprophagous insects being found in New Holland, where no large quadrupeds (upon the dung of which they are supposed to exist) were indigenous. He considered, however, that there was but little difference in respect to the taste of these insects for decaying animal or vegetable matter.

Mr. Kirby also stated that he had observed Coprophagous insects revelling in putrid carrion; and Mr. Hope stated that he had found many *Aphodii* in a dead rabbit; whilst Mr. Marshall observed, that he had detected *Aphodius* under putrid bark of trees. Mr. Westwood also stated that it was, on the other hand, equally common to find the large *Necrophori* in rotten fungi and mushrooms.

July 1, 1839.

The Rev. F. W. Hope, President, in the Chair.

Donations.

Natural History Illustrations, No. 1, and

Magazine of Natural History, New Series, No. 31. Presented by the Editor.

Instructions for collecting and preserving Insects, 2d edition. By Mr. A. Ingpen, the Author thereof.

British Coleoptera delineated, No. 3. By Messrs. Spry and Shuckard.

The Athenæum for June. By the Editor.

Four specimens of *Meloe cicatricosus*. By Mr. W. Bennett, who had observed this species covering the bank next the sea at Pegwell Bay, at the end of May.

Robert Mitford, Esq. of Manchester,
was balloted for, and elected an Ordinary Member of the Society. And

Lieut. R. H. Sayers, 31st regiment, and

Dr. Cantor,
were elected Corresponding Members.

Exhibitions, Memoirs, &c.

Mr. Barraud exhibited a very minute wasp's nest, found inside a sparrow's nest; the outer globular covering of which was about one inch and a quarter long, and seven-eighths of an inch in diameter, and appeared of a texture nearly resembling saw-dust or fine sand. In the interior at the base were fourteen cells commenced, each not being above two lines wide.

Mr. Raddon mentioned the arrival of three more specimens of *Goliathus regius* at Bristol, brought by vessels trading to Africa.

Mr. W. Bennett exhibited a living specimen of *Calosoma Sycophanta*, captured between Ramsgate and Broadstairs on the 20th June; the day was calm and fine, but not unusually hot; it was slightly injured in the elytra; it had been kept alive by feeding it with moths, and it was stated that Mr. Desvignes had kept an Austrian specimen alive four months by feeding it on caterpillars. Mr. Hope stated, that he had obtained sixteen specimens in one season, which were found at the roots of oaks in the avenue leading to Eaton Hall. All these specimens were of a green colour, and destitute of the coppery tint on the elytra. Mr. Newport also mentioned the capture of a specimen in Herne Wood, between Herne and Canterbury.

Mr. Westwood exhibited three species of a singular Mexican genus of Malacoderm beetles, *Chactas*, the males of which (contrary to the ordinary rule amongst insects) are much larger than the females, and have the elytra singularly dilated; and observed, that amongst cornuted insects, the males were also generally larger than the females. Mr. Shuckard also mentioned, that in the genera *Apis* and *Anthidium* the same diversity prevailed, although in the other genera of bees the females were the largest.

Mr. Westwood also exhibited a species of the curious Orthopterous genus *Hymenotes*, W. (Proc. Zool. Soc.—*Choriphyllum*, Serv.) from Manilla. A species of this genus had been known to Linnæus and Fabricius, who, deceived by its analogy with the *Membracides*, had described it as a species of *Cicada*. (See the memoir on this genus subsequently published in the Magazine of Natural History).

Mr. Hope read the descriptions of a portion of a splendid collection of insects made in Assam by Mr. Griffith, and forwarded to R. H. Solly, Esq., which were exhibited, and made some verbal remarks upon others in the collection.

5th August, 1839.

The Rev. F. W. Hope, President, in the Chair.

Donations.

Transactions of the Zoological Society of London, Vol. 2, part 3, and

Proceedings of the Zoological Society—August to November, 1838. Presented by that Society.

British Coleoptera delineated, Part 4. Presented by Messrs. Spry and Shuckard.

Catalogue of the Coleoptera of Wurtemberg. Presented by M. van Roser, the Author thereof.

Bulletin de la Société Impériale des Naturalistes de Moscou, 1838, Part 4. By that Society.

Journal of the Natural History Society of Boston, Vol. 2, Nos. 1 and 2. By the publishing Committee of that Society.

No. 32 of the Magazine of Natural History, New Series. By the Editor.

The Athenæum for July. By the Editor.

Monographia Chalciditum, Vol. 2. By F. Walker, Esq., the Author thereof.

Description of a New Species of *Lamia*, from the Swan River. By the Rev. F. W. Hope.

Specimens of *Tillus unifasciatus*, captured near Camberwell. By J. F. Stephens, Esq.

Exhibitions, Memoirs, &c.

Mr. Raddon exhibited some new species of North American *Coleoptera*, obtained from raw turpentine.

Mr. Hope exhibited some African insects, including several *Osmodermæ*, which had been hitherto described as American.

Mr. Yarrell exhibited a small collection of insects, made by Mr. Whitfield at Sierra Leone.

Mr. Ogilvie noticed the great devastation in Epping and Hainault Forests, caused by the *Tortrix viridana*, the insects being so numerous as to fall from the trees when shaken like a sharp snow storm, in consequence of which the trees spent all their vital energy in repairing the loss of the leaves, instead of throwing out fresh branches. Mr. Stephens had also observed similar devastation in the woods of Surrey.

Branches and leaves of the pear and manettia trees, infested by two species of *Coccus*, were exhibited by Mr. Loudon.

Short notes upon the metamorphoses of a species of gall insect, found at Neemuck, in Western India. Communicated by Capt. Downes.

Notice of a mode of preventing Caterpillars, Woodlice, &c. from ascending the trunks of trees. By Mr. Fennell.

Extract from a letter addressed to the Secretary by W. Knott, Esq. M. E. S., containing an account of the occurrence of a cocoon of the Emperor moth, which inclosed two pupæ.

September 2d, 1839.

George Newport, Esq., Vice President, in the Chair.

Donations.

Memoir on *Cydippe pomiformis*. By Robert Patterson, Esq., the Author thereof.

No. 33 of the Magazine of Natural History. New Series. By the Editor.

Catalogue des Lépidoptères de la Belgique. By M. De Selys Longchamps, the Author thereof.

Description of the Crustacea and Insects taken during the Voyage of the "Favorite." By M. Guérin Meneville, the Author thereof.

Specimens of *Micralymma Johnstonæ*, Westw., presented by Mr. A. White, accompanied by the following note of its habits, and of those of *Æpus fulvescens*.

"These specimens of *Æpus fulvescens* and *Micralymma Johnstonæ*, are from a point of land about a quarter of a mile to the west of South Queensferry, on the Frith of Forth, a locality for the two species first found by Dr. Greville. In company with his son I took these and several other specimens in August last; the *Micralymma* in great abundance creeping slowly over the thin layers of black sandy mud which lie between the surface (laminæ) of slaty sandstone rock, of which the coast is composed. The *Æpus* is more scarce, though far from uncommon, its light colour renders it at once distinguishable on the black ground over which it runs with considerable rapidity. Dr. Greville has found the *Cillenum laterale* in the same locality, but it seems to be very scarce there, as only three specimens have occurred during a search of two or three years. It may be interesting to the British

collector to inform him that three specimens of the rare *Pissodes Fabricii* have been taken in Dalmeny Park near South Queensferry, by Mr. Robert Northmore Greville, two last year and one this."

Mr. Ingpen exhibited a number of varieties of the common *Bedeguar* upon the wild rose, also leaves of the Chrysanthemum mined by the larvæ of a species of *Tephrites*, and stated that this insect confines its attacks to the lower leaves, and not to those of the younger upper branches, thus occasioning but little injury to the plant.

Mr. Hatches exhibited a drawing of a singular variety of *Hipparchia Hyperanthus*, and Mr. Hope a large species of *Phrynus* from Sierra Leone.

Mr. Westwood exhibited nine species of *Paussidæ*, and four of *Diopsis* from the Collection of Mr. Westermann of Copenhagen, (since described by him); likewise some singular *Carabidæ* from New Holland, and a specimen of *Hypocephalus armatus*.

The following memoirs were read:

"Notes upon the Habits of various Species of British Ants." By Mr. F. Smith.

"Description of a new Species of *Mygale* from Ionia." By S. S. Saunders, Esq.

October 7th, 1839.

The Rev. F. W. Hope, President, in the Chair.

Donations.

Part 4 of an Introduction to the Modern Classification of Insects. By J. O. Westwood, the Author thereof.

No. 34 of the Magazine of Natural History. New Series. By the Editor.

Nos. 5 and 6 of British Coleoptera delineated. By Messrs. Spry and Shuckard.

John Beadnall, Esq., of Tottenham, was ballotted for and elected an Ordinary Member of the Society.

Exhibitions, Memoirs, &c.

Mr. W. W. Saunders exhibited a species of *Julus*, which had been very destructive in his garden at Wandsworth, especially devouring the young shoots of heartsease just below the surface.

Mr. A. White exhibited a drawing of a large and singular wasp's nest in the British Museum, and read some notes relative to it and the nests of allied species. (See his Memoir since published in the Annals of Natural History.)

Mr. Shipster exhibited a small collection of insects from South Australia, including a large species of *Mygale*, which he considered to be the architect of the nest with a semicircular trap-door exhibited by him at a former meeting.

Mr. Fortnum exhibited a living specimen of one of the large Brazilian species of *Mygale*, captured alive in the London Docks.

A letter was read from Mr. W. G. Chapman, accompanying a pair of living specimens of a species of *Mygale*, sent from Barbary, by E. A. Drummond Hay, Esq., inclosed in their nests with trap-door tops (*Actinopus ædificatorius*, Westw., Journal of Proceedings, January 6th, 1840.) Mr. Waterhouse stated that several of these spiders had been sent to the Zoological Society, which he had kept alive by feeding them on blue-bottle flies.

Mr. Barnes presented a nest of a species of wasp attached to a boarded ceiling, accompanied by a letter containing some account of its construction.

Mr. Lane exhibited a specimen of *Hipparchia Briseis*, a species not hitherto recorded as British, which he had himself reared, having found the caterpillar in the middle of August last upon grass in the neighbourhood of Newington.

Mr. Hope made some observations upon a migration of dragon-flies recorded in the Magazine of Natural History of this month, and stated that he had witnessed a nearly similar migration of the same insects some years ago at Netley, and which he attributed to the drying up of some large reservoirs of water. In this instance several distinct species were observed. A larva of one of these insects had been brought to him as a strange kind of locust!

A few brief notes on sundry precautions efficacious in preserving furs and woollen articles from the attacks of moths, were read by the Rev. F. W. Hope.

November 4th, 1839.

George R. Waterhouse, Esq., Vice-President, in the Chair.

Donations.

Specimens of *Coccinella M. nigrum*. By Mr. Rix.

Johannes Goedartius, De Insectis. 8vo. 1685.

The Ordering of Bees. By John Levett, Esq., 1634.

A Treatise of Politicall Flying Insects. By Samuel Purchas, 1657.

A New Discovery of an excellent Method of Bee-houses. By John Gedde, 1676.

Vinetum Britannicum, to which is added a Discourse teaching the best way of improving Bees. By J. Worledge, 1678.

A further Discovery of Bees. By Moses Rusden, 1679.

The Feminine Monarchy, or the History of Bees. By Charles Butler, 1704.

The true Amazons, or the Monarchy of Bees. By Joseph Warder, 1726.

A volume containing the following tracts :

The Natural History of the Elephant. By T. O. Tennant, 1781.

Collateral Bee-boxes. By S. White, &c. 1764.

Essay on the Management of Bees. By John Mills, 1766.

A complete Guide for the Management of Bees. By Daniel Wildman, 1775.

The Cocker's Companion. By Wentworth, 1762.

Essay on the Herring. By J. S. Dodd, 1752.

Art of hatching Fowls. By Mr. Trembley, 1750.

New Observations on the Natural History of Bees. By Francis Huber, 1821.

A complete Guide for the Management of Bees. By Daniel Wildman, 20th Edit., 1819.

A Treatise on the Natural History of Bees. By James Bonar. Edinb. 1796.

The Experienced Bee-keeper. By B. J. Bromwich. Lond. 1783.

Melisselogia, or the Female Monarchy. By the Rev. J. Thorley, 1744.

Collateral Bee-boxes. By Stephen White, 1756.

Traité complet sur les Abeilles. Par l'Abbé de la Rocca. 3 vols. 8vo., 1790.

A Treatise on the Nature, Economy, and Practical Management of Bees. 1817.

A Treatise on the Breeding and Management of Bees. By John Keys, 1814.

The Cottager's Manual for the Management of his Bees. By Robert Huish, 1820.

The General Apiarian. By J. Isaac. Exeter, 1799.

The Management of Bees. By Samuel Bagster, 1834.

The Natural History of Bees, translated from the French. 1744.

A short and simple Letter to Cottagers, from a Conservative Bee-keeper. Oxford.

Hints for Promoting a Bee Society. London, 1796.

Spectacle de la Nature, translated from the French. 1783.

Observations on the Genus *Cassida*. (From the Annals of Natural History.)

All the foregoing Works were presented by the Rev. F. W. Hope, President of the Society.

Essai sur les Genres de Insectes appartenants à l'Ordre des Hémiptères et à la Section des Hètéroptères. Par M. le Marquis Max. Spinola, the Author thereof.

The Article "Insecta" from the Cyclopædia of Anatomy and Physiology. By George Newport, Esq., the Author thereof.

No. 35 of the Magazine of Natural History. New Series. By the Editor.

No. 7 of British Coleoptera delineated. By Messrs. Spry and Shuckard.

Richard William Lack, Esq., 41, Weymouth Street, Portland Place, was ballotted for and elected a Member of the Society.

Exhibitions, Memoirs, &c.

Mr. Trenchard exhibited a drawing of a remarkable variety of *Vanessa urticæ*, having the black costal spots confluent.

Mr. Hope exhibited specimens of *Goliathus torquatus* ♀, *Eudicella Morgani*, and other rare insects received by him from Mr. Strachan at Sierra Leone.

Mr. Newport exhibited a specimen of *Scolopendra morsitans?* in which one of the legs on one side of the body was not more than half the size of the corresponding leg of the opposite side, and which he considered had been reproduced, the former limb having been lost previous to one of the moultings of the animal; the limb, although so much smaller, nevertheless exhibited all the

ordinary joints. This, which was supposed by Mr. Newport to be the only instance yet observed of reproduction amongst the *Myriapoda*, led to an extended discussion as to the mode in which this kind of reproduction either in insects or other annulosa is effected.

Sir Thomas Phillips exhibited specimens of *Cryptophagus cellaris*, which had attacked some raspberry jam, and rendered it unfit for use.

Mr. Moore exhibited a small wasp's nest built beneath the projecting ledge of a window.

A paper in Latin by Dr. Imhoff of Basle was read, consisting of critical observations upon Mr. Kirby's *Monographia Apum Angliæ*.

Mr. A. White communicated an extract from Sir A. Halliday's work upon the West Indies, relative to the migrations of Dragonflies.

December 2d, 1839.

George Newport, Esq., in the Chair.

Donations.

Manual of British Coleoptera. By James F. Stephens, Esq., the Author thereof.

British Coleoptera delineated, No. 8. By Messrs. Spry and Shuckard.

No. 14 of an Introduction to the Modern Classification of Insects. By J. O. Westwood, the Author thereof.

Proceedings of the Zoological Society for May. By that Society.

No. 36 of the Magazine of Natural History. New Series. By the Editor.

The Athenæum for October and November. By the Editor.

Exhibitions, Memoirs, &c.

Mr. G. R. Waterhouse exhibited the larva of a Lamellicorn insect, from the body of which an elongated fungus or *Sphæria* had grown. Other instances of a similar kind were mentioned, including the growth of similar excrescences on great numbers of North American *Cicadæ*, by Mr. Stephens.

Dr. Calvert read a notice of the attacks of one of the *Noctuidæ*

upon the ears of standing corn, which led to a discussion, in which it was suggested that the only advisable remedy against the attacks of fresh broods of these insects, was to subject the land to repeated ploughings after the crop had been got off, and the insects gone into the earth to undergo their transformations, in order to expose them to the rooks as well as to the action of the atmosphere. Salt having been suggested as serviceable to be strewn over the fields, Mr. Waterhouse objected that the salt-marshes in the neighbourhood of the sea were productive of many insects.

Dr. Calvert also exhibited a cocoon apparently of one of the Eggar moths, the interior of which was occupied by a great number of the minute cocoons of one of the *Ichneumones adsciti*, closely arranged with great regularity; and Mr. Westwood exhibited various other nests of different insects, in which the cocoons had been arranged in a similar manner in close connexion together.

A Memoir by W. W. Saunders, Esq., was read, containing descriptions of some new exotic Dipterous insects.

Mr. Ashton, in allusion to the *Scolopendra* exhibited by Mr. Newport at the last meeting, made some observations with the view of showing that the various instances on record of the reproduction of limbs by the annulose animals never took place except at the period of moulting, and whilst the animals were consequently in an imperfect state, and that the process was not analogous to that which was going forward throughout the life of the higher animals, whereby a partial reproduction took place; and Mr. Yarrell suggested that a material difference took place in respect to the moulting of crabs, which occurred during the entire period of their existence, and insects in which moulting never occurred after their arrival at the perfect state.

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The Author .....Agassiz (L.), Nomenclator Zoologicus, continens nomina systematica generum Animalium. Parts 1—4.
Royal Agricultural Society. See Journal.
Mr. Van Voorst ....The Naturalist's Almanack for 1843.
Rev. F. W. Hope ..Amœnitates Academicæ, and Supplement. 11 vols. 8vo.
The Society .....Annales de la Société Entomologique de France. 1839, 1840, 1841, and 1842, Parts 1, 2, and 3. 1843, Part 1.
The Editor .....The Athenæum, a Weekly Journal of Literature and Science.
H. Milne Edwards ..Audouin (Victor), Funerailles de.
Ditto..... ——————— Necrologie de.
Ditto..... ——————— Catalogue of the Library of.
Ditto..... ——————— and Brulle, Descriptions des Espèces nouvelles des Cicindelétes.

The Society .....Bavaria, Abhandlungen der Mathematisch Physikalischen Klasse der Königlichen Bayerischen Akademie der Wissenschaften. Erster Band, 1832. Zw. B. 1837. Dr. B. Part 1, 1840. Part 2, 1841.
Ditto..... ——— Bulletin der Königl. Akad. der Wissensch.
Rev. F. W. Hope ..Blumenbach, Elements of Natural History, by Gore.
The Editor .....Bombay Monthly Times (No. 1).
The Society .....Boston, Proceedings of the Natural History Society of.
Ditto..... ——— Natural History Society of. See Journal.
The Author .....Bourlét (M. l'Abbé), Memoire sur les Podurelles.
The Author .....Brandt, Recueil des Memoires relatifs à l'Ordre des Insectes Nigriapodes.
The Author....., Breme (M. le Marq. de), Reflexions sur la Classification des Insectes.
Ditto..... ——————————— Essai sur les Cossyphides.
Ditto..... ——————————— Monographie de quelques Genres de Coléoptères Hétéromerès.
Rev. F. W. Hope ..Browne, Travels in Africa, Egypt, and Syria.
M. Brulle .....Brullé (Lucas et Macquart), Animaux Articulés recueillis aux Iles Canaries.
The Society .....Bruxelles, Nouv. Mémoires de l'Académie Royale de. Vols. 13 and Vol. 14, Part 2. Vol. 15, Part 1, pl. 2?
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The Society .....Bruxelles, Annuaires de l'Académie.
Ditto .....——— Des Moyens de soustraire l'Exploitation des Mines.
Ditto .....——— Instructions pour l'Observation des Phénoménes Périodiques.
The Author .....Burmeister (Hermann), Genera Insectorum. Nos. 6 and 7.
Ditto .....——————— The Article "Insect" from the Allgemeine Encyclopadie.
Ditto .....——————— Handbuch der Entomologie. Vol. 3.

The Editor .....Calcutta Journal of Natural History. Parts 1 and 2, and 9 to 12. Edited by Mr. MacClelland.
Rev. F. W. Hope ..Comptes rendus de l'Institut. A quantity of Numbers.
The Author .....Costa (Signor Achille), Monografie degl' Insetti ospitanti sull' Olivo e nelle Olive.
Ditto .....——————— Bulletino dell' Accademia degli Aspiranti Naturalisti. Anno 1mo.
Ditto .....——————— Di una Specie di Henestaris.
Ditto .....——————— Ragguaglio delle Specie piu Interessanti di Emitteri-eterotteri.
Ditto .....——————— Esposizione sommaria delle Osservazioni racolte duranto l'Anno 1842.
Ditto .....——————— Nuove Osservazioni intorno alle Cocchineglio ed ai loro pretesi Maschi.
The Author .....Curtis (John), Observations on the Natural History of Insects infesting the Turnip. Part 1.
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Ditto .....Dejean, Catalogue des Coléoptères. 3d Edit.

The Author .....Edwards (H. Milne), Récherches pour servir à l'Histoire de la Circulation du Sang chez les Annelides.
Ditto .....——————— Récherches sur le Mécanisme de la Respiration chez les Crustacés.
Ditto .....——————— Observations sur les Changemens de Forme que divers Crustacés éprouvant dans le jeune Age.
Ditto .....——————— Mémoire sur la Distribution Geographique des Crustacés.
The Society .....Sixth Report of the Egyptian Society.
The Editor .....Entomologist (The). Edited by Edw. Newman.
The Author .....Erichson (Dr.), Genera et Species Staphylinorum. Vol. 2.

Rev. F. W. Hope ..Fabricius, Systema Entomologiæ.
The Author .....Fischer de Waldheim (Comte G.), Notice sur l'Eurypterus de Podolie et le Cherotherium.
Ditto .....——————— Mémoire sur les Spectres.
Ditto .....——————— Catalogus Coléopterorum Sibericæ Orientalis.
Ditto .....——————— Index Plantarum in regionibus Altaicis.

The Author .....Gene (Guesippe), Memoria per servire alla Storia Naturale di alcuni Imenotteri.
The Society .....Geneva, Memoires de la Société de Physique et d'Hist. natur. de. Tom. 9.
The Editor .....Germar, Zeitschrift für die Entomologie. Vol. 3, Parts 1 and 2.
The Author .....Goodsir (H. D. S.), Descriptions of some new Species of Pycnogonidæ.
Ditto .....——————— Descriptions of some new Crustaceous Animals from the Frith of Forth.
Ditto .....——————— On Two new Species of Leachia.
Ditto .....——————— On a new Genus and six new Species of Crustacea.
J. E. Gray, Esq.....Gray (J. E.), The Zoological Miscellany. Four sheets of Part 2.
M. Guérin .. ..Guérin-Meneville et Perottet, Mémoire sur un Insecte et un Champignon qui ravagent les Cafiers aux Antilles.

The Author .....Hagen, Synonymia Libellulidarum Europæarum.
The Author .....Harris (T. W.), Remarks on Scarabæus Goliathus.
Rev. F. W. Hope ..Herbst, Krabben und Krebsen. Vols. 1, 2, and 3.
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Mr. James Dickson..Hope (Rev. F. W.), Lithographic Portrait of.
The Author .....——————————— Memoir on the Erotylidæ (from the Revue Zoologique).
Ditto .....——————————— Descriptions of some new Insects from Western Africa.
The Publisher.....Humphreys and Westwood, British Butterflies and their Transformations. Nos. 1—4, 5, 6, 7.

Purchased .....Insect Architecture. 12mo.
Ditto .....Insect Transformations. 12mo.
Ditto .....Insect Miscellanies. 12mo.

The Society .....Journal of the Royal Agricultural Society of England. Vol. 1, Part 4. Vol. 2, Parts 1, 2, 3. Vol. 3, Part 1. Vol. 4, Part 1.
The Society .....Journal of the Natural History Society of Boston. Vol. 1, Parts 1—4. Vol. 2, Part 4. Vol. 3, Parts 1, 2, 3, and 4. Vol. 4, Nos. 1 and 2.
The Editor .....Journal of Meteorology. Edited by J. W. G. Gutch.

The Author .....Lacordaire (Theod.), Monographie des Erotyliens.
Ditto .....——————————— Revision de la Famille des Cicindelites.
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Rev. F. W. Hope ..Leeuwenhoeck, Epistolæ ad Societatem Regiam Anglicam.

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Ditto .....——————————— Communication verbale sur la Pterologie.
Ditto .....——————————— Mémoire sur le genre Ascalaphus.
The Society .....Lille, Mémoires de la Société Royale de. 1836. 1838, Parts 2 and 3. 1839, Parts 1 and 2. And 1840.
Mr. R. Taylor.....Lists of Meetings of Philosophical Societies of London annually.
Lucas. See Brullé.
The Society .....Lyons, Annales de la Société Royale d'Agriculture de. Vols. 1, 2, 3, 4.

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The Author .....Maelen (Van der), Episténomomie.
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———. See Brullé.
The Author .....Mannerheim (M. le Comte), Mémoire sur la Récolte d'Insectes Coléoptères en 1842.
Ditto .....——————————— Description de quelques nouveaux Espèces de Coléoptères de Finlande.
Ditto .....——————————— Notice sur la Collection de Coléoptères de M. Dejean.
Ditto .....——————————— Description d'une nouv. Esp. de Physodactylus.
Ditto .....——————————— Observations relatives aux Sexes des Coléoptères Hydrocanthares.
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Roy. Acad. of Bavaria . Martius (G. F. Von.), Die Kartoffel Epidemie.
Rev. F. W. Hope ..Martyn, Araner. Folio.
Ditto .....Martinet, Katechismus der Natur. 4 vols. 8vo.
The Author .....Menetries, Essai d'un Monographie du G. Anacolus.
Ditto..... ——— Catalogue d'Insectes recueilles entre Constantinople et le Balkan.
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The Editor .....Microscopic Journal. No. 1. Edited by Mr. Daniel Cooper.
The Society .....Microscopical Society of London, Transactions of. Part 1.
The Author .....Montagne, Mémoire sur la Muscardine.
The Society .....Moscow, Nouveaux Mémoires de la Soc. Imper. des Naturalistes. Tom. 5. (1837.)
Ditto .....——— Bulletin de la Soc. Imp. des Naturalistes de 1838, 1839, 5 Nos. 1840, Nos. 3 and 4. 1841, Parts 1, 2, 3, and 4. 1842, Part 1.

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Rev. F. W. Hope ..Partington, Scientific Gazette.

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Ditto .....———————— Continuazione sulle Osservazioni sulle Larve di Scolia flavifrons.
Ditto .....———————— Osservazioni sopra due Insetti nocivi (Lytta verticalis et Apate 6-dentata).
Ditto .....———————— Notizie relative a tre Specie d'Insetti nocivi.
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Rev. F. W. Hope ..Pennant's Zoology. 4 vols. 8vo.
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The Editor .....Physiological Journal. No. 1.
The Editor .....Phytologist. Edited by Edward Newman. No. 1.
The Author .....Pictet (F. J.), Hist. Nat. des Ins. Neurop. Fam. Perlides.
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Rev. F. W. Hope ..Reaumur, Memoires pour servir à l'Histoire des Insectes. Vols. 1, 2, and 3.
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The Author .....Romand (M. le Baron de), Mémoire sur le genre Pelecinus.
Ditto .....———————————— Notice sur diverses Melliféres.
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Ditto .....——————— Proceedings of (continuation of).
Ditto .....——————— List of Fellows of.

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Ditto .....———————————— Ueber die Faden-wurmer der Insekten.
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Ditto .....———————————— Ueber Strepsiptera.
The Author .....Spinola (M. le Marq.), Considerations of the Habits of the Genus Sirex.
Ditto .....———————— Observations on the Natural Characters of the Vespariæ, Masaridæ, and Chrysididæ.
Ditto .....———————— Considerations on the Natural Characters of the Prionidæ.
Mr. A. White .....Synopsis of Contents of British Museum.

The Author .....Tulk (Alfred), Memoir on the Anatomy of Phalangium.

The Author .....Walckenaer (M. le Baron), Mémoire sur les abeilles solitaires du G. Halictus.
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F. Walker, Esq. ....A set of Plates of Chalcididæ, from the Drawings of A. H. Haliday, Esq., published in the Entomologist.
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Westwood. See Humphreys.
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Ditto .....——————— Descriptions of new Insects from Congo.
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Ditto .....——————————————— List of Fellows. 1843.
Ditto .....——————————————— Report of the Council and Auditors. April, 1843.
The Editor .....The Zoologist. Nos. 1 and 2. Edited by Edward Newman.

ADDRESS

ON THE

RECENT PROGRESS AND PRESENT STATE

OF

ENTOMOLOGY.

By J. O. WESTWOOD, F.L.S.

SECRETARY OF THE ENTOMOLOGICAL SOCIETY OF LONDON, ETC.

Read at the Anniversary Meeting of the Entomological Society, on the 21st January 1835.

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1835.

ADDRESS

ON

THE RECENT PROGRESS AND PRESENT STATE OF ENTOMOLOGY.

GENTLEMEN,

IN rising, at the request of our late most excellent President,—whose departure from the Chair this evening will, I am sure, be regarded with the utmost regret by every member of this Society,—whose kindness, urbanity, and efficiency have afforded a most valuable model to our future Presidents,—to lay before you a statement of the recent progress and present state of Entomology, I must at the outset bespeak your kindness towards the attempt which I am about to make, feeling fully convinced of my own inefficiency to do justice to a subject of such extent as well as importance. I could, indeed, have wished that notwithstanding the numerous avocations of our late President, he would still have found sufficient leisure for the task, feeling equally convinced that in his hands ample justice would have been done to the subject, founded upon the possession both of a magnificent collection of insects and a splendid library, in which the necessary materials for such a labour as I have undertaken are alone to be found. As, however, the case is otherwise, and as he has been pleased to place this subject in my hands, I know not how I can do better than to select as my model the address delivered by himself before the Zoological Club of the Linnæan Society in the year 1827. Let us hope that our Society may flourish as that Society has done which originated in the assembly before which the address alluded to was delivered; let us hope that whatever trifling feuds may have arisen amongst entomologists,—for so long as "humanum est errare," so long will there be presumed matters of offence, even where no offence was intended,—let us hope, I say, that such will be allowed to die away and sink into nothingness before the sacred cause of truth and science.

It has always appeared to me that scarcely any kind of publication surpassed in utility, annual or other periodical summaries, in which

are concentrated the various subjects which have, since the date of the preceding report, occupied the attention of those persons who are engaged, far and wide, in any particular branch of science. The celebrated traveller Burchell, shortly after his return from South America, where he had collected an immense number of zoological objects, but especially of insects, complained to me that he had no means of knowing what had taken place during his absence relating to the various branches of zoology; he could meet with no summary in which the various publications upon its different sections were brought into one view. To supply in some measure this want, as relates to the domain of entomology, is the object of the present address, although I fear that the execution will fall short of the conception of the undertaking. As, however, it is some time since the last address, by Mr. Vigors, was delivered before the Zoological Club, and as it has appeared to me to be highly desirable to refer to the invaluable publications of our continental, as well as native fellow labourers, rather than to confine these observations to the proceedings of our own Society, which must, to a considerable degree, be fresh in the recollection of the majority of our members, I have enlarged my canvas, and instead of presenting you simply with a miniature of the personification of the Entomological Society of London, I have introduced a sketch of the labours of entomologists throughout the entomological world, placing in the centre of my picture, (if I may be allowed an artistical idea,) hand in hand, the Entomological Societies of France and London, on either side of which will be seen the representatives of the scientific Societies and of the scientific men, our fellow-labourers throughout the world, whilst the venerated and deeply lamented names of Latreille and Cuvier, of Haworth and Guilding, and of Say, shine in the clouds with a glorious radiancy, throwing around a light of approval upon the ardent aspirers after science still left amongst us.

In the first place, indeed, the recent establishment of the Entomological Societies of France and London is to be mentioned as of the first-rate interest in respect to the progress of our devoted science. England, it is true, led the way by the establishment of an Entomological Society nearly forty years since, for the support of which the best energies of Mr. Haworth were in an especial manner, and for a length of time, devoted; but for the last twenty years nothing had been done by it—the Bee, which it had selected as its emblem, had become inert—until our present Society arose in its stead; so that we may very entomologically infer that the Bee of the old Society had been Stylopized, and had at length given birth to the *Stylops Kirbii*[1]. But it is to the establishment of the French Entomological Society that we may in some measure regard the rousing of the energies of our own entomologists. And it is impossible to doubt that the honourable rivalry which has thus arisen between us cannot but be of the greatest service to the science which we cultivate.

The formation of these societies is likewise indicative of another circumstance, dependent thereupon, which cannot fail to impart gra-

[1] Engraved upon the seal of the present Entomological Society.

tification to the entomologist, namely, the very increased degree of general attention now paid to the study of natural history, and especially to Entomology, and which, I think, may be now considered as a powerful rival of the sister science of Botany. Moreover, it is not in England alone that this is the case; in France and Germany, Italy and Sweden, Russia, Austria, and America, we find the same energy; and now-a-days it is no easy matter even to keep *au courant* with the proceedings of the numerous entomologists of those countries.

Mr. Vigors in his address to the Zoological Club in 1830, observed, "It is one of the prominent features of the present times that naturalists aim at a happy union of true science with popular attraction. The principle of 'Gratior pulchro veniens in corpore virtus' was never more strongly exemplified than in these popular publications. When I mention to you that copies of these publications" (referring to 'The Menageries' and 'Insect Architecture', published by the Society for the Diffusion of Useful Knowledge,) "have been disseminated by tens of thousands, you may calculate not merely how many readers participate in the delights of the study, but how many of them may be induced from the perusal to become observers of nature, if not active cooperators in the science." If there were this cause for exultation when only one volume devoted to insects was published by this Society, surely we have much greater grounds for gratification when three similar volumes upon entomological subjects have been issued by it, viz.—'Insect Architecture', 'Insect Transformations', and 'Insect Miscellanies'; a similar volume by the Society for the Promotion of Christian Knowledge, two volumes on the Natural History of Insects in Mr. Murray's Family Library, two in Constable's Miscellany, and one (on Beetles) in Sir William Jardine's Naturalist's Library, besides numerous detached articles in those widely spreading papers, the Penny and Saturday Magazines. The establishment likewise of several periodical works devoted exclusively to our science in Germany, France, and England, are striking evidences of the correctness of this idea.

If we now descend a step in our views, we still find matters of equal gratification in the practical nature of a considerable portion of the proceedings of our own Society. Need I mention the memoirs which have been read before us upon the Domestic Fly by Mr. Spence; upon the Nature of Resin and Amber Insects, by the Rev. F. W. Hope; the memoirs upon Silk and Silk Insects, and upon the Ravages of *Limnoria terebrans*, by the same gentleman; the proposed establishment of premiums for Prize Essays; the memoir upon Apple Blight, by Mr. Lewis; or the proceedings of our committee upon the ravages of the Cane Fly, &c.? In like manner the natural history and œconomy of various species of insects have been in an especial manner brought before the notice of the Society, as in the memoirs of Lieut.-Col. Sykes upon various East India Ants and other Indian Insects; that of Mr. Shuckard upon the Fossorial *Hymenoptera* of our own country; that of Mr. Christy upon the Tamarind Beetle; that of Mr. Saunders upon various species of East Indian Insects; that of Mr. Waterhouse upon *Raphidia*, &c.

In these respects, indeed, a material difference exists between the proceedings of the Societies of London and France, the latter being especially marked by a greater degree of attention paid to the technical and descriptive details of various groups of insects, as in the memoirs of Latreille upon the *Sternoxi*, of Serville upon the *Longicornes*, of Solier upon the *Heteromera*, &c.

The nature of the various publications which have recently appeared in England is calculated to obtain a high degree of respect both at home and abroad for the entomologists of this country. The national work of Mr. Stephens [1] is proceeding onwards, notwithstanding the numerous and almost insurmountable obstacles with which its talented author has had to contend, whilst his Systematic Catalogue [2] is a work exhibiting the most astonishing exertion; the highly beautiful and invaluable work of Mr. Curtis [3]; the completion of Mr. Haworth's 'Lepidoptera Britannica' [4]; the 'Australian Entomology' [5] of Mr. George Gray, with its beautiful illustrations from the pencil of Mr. Charles Curtis; the English Translation of the Règne Animal, by Mr. Griffith and others [6]; and the work upon the *Lepidoptera* of Java, by Dr. Horsfield [7]; together with numerous valuable memoirs published in the Magazine of Natural History, the Philosophical Magazine, Dr. Jameson's Edinburgh Journal, the Linnæan and Zoological Societies' Transactions, in the Entomological Magazine, and last, but not least, in the Transactions of our own Society; all proving that the spirit of Entomology is rising strongly amongst us, needing only to be directed into its proper and legitimate channels.

Of continental works of a general nature, one of the most valuable is unquestionably the 'Iconographie du Règne Animal' of M. Guérin;

[1] Illustrations of British Entomology, or a Synopsis of Indigenous Insects, &c. By J. F. Stephens, F.L.S., &c. Large 8vo. 1828—1835. In monthly parts, with coloured figures, containing generic and specific descriptions of all the indigenous insects.

[2] A Systematic Catalogue of British Insects, being an attempt to arrange all the hitherto discovered Indigenous Insects in accordance with their natural affinities. By J. F. Stephens, F.L. & Z.SS., &c. 8vo. 1829. 804 pp. Containing the synonyms and references to about 10,000 species.

[3] British Entomology, or Illustrations and Descriptions of the Genera of Insects found in Great Britain and Ireland. By John Curtis, F.L.S., &c. Large 8vo. 1824—1825. With coloured figures of the insects, and in many instances of the plants upon which they are found.

[4] Lepidoptera Britannica, sistens Digestionem novam Insectorum Lepidopterorum quæ in Magna Britannia reperiuntur. Auct. A. H. Haworth, F.L.S. Lond. 1803—1828. 8vo.

[5] The Entomology of Australia, in a Series of Monographs. By G. R. Gray. Part I. Containing a monograph of the genus Phasma. Lond. 1833. 4to. With coloured plates.

[6] The Animal Kingdom described and arranged in conformity with its Organization, by the Baron Cuvier: with additional descriptions and other original matter, by Edward Griffith, F.L.S., and others. Lond. 8vo. Parts 28—36. Containing the Insecta, Crustacea, Arachnida, and Annelida, with very numerous plates.

[7] A Descriptive Catalogue of the Lepidopterous Insects contained in the Museum of the Honourable East India Company. By Thomas Horsfield, M.D. F.R.S., &c. Lond. 4to. Parts I. and II. 1828—1829. With plates.

the utility of which has been already evinced by the republication of it in this country in two or three different works.

The announcement likewise, and commencement of the publication, of a series of works in Paris, in which each order of insects has been undertaken by an author distinguished in his particular branch of the science, forms a gratifying era in our science [1].

It has been well said that the field of zoology is so extensive that no one can with effect undertake the cultivation of more than a detached portion. And this remark is not less forcibly applicable to entomology alone. Hence, in proof of the justice of this observation, numerous memoirs and monographs devoted to isolated groups of insects have recently been published, which I now proceed to notice as concisely as possible, premising that it is not improbable that, notwithstanding all my exertions, many of these may not have come to my knowledge, and that in an address like the present, only the more material can be noticed, and that in a very cursory manner, and without reference to the theories or doctrines which they may in some instances elucidate. I need not say how much I shall feel obliged to any gentleman who will have the kindness to supply any of the deficiencies which must necessarily occur in my address. Perhaps it will be more convenient to arrange these notices according to the classification of the great groups of annulose animals, rather than to bring under review, in the first place, the proceedings of our own Society, and then to pass to the notice of English and foreign memoirs.

To commence therefore with the Crustacea.

This class of annulose animals, it is true, has not engaged so much of the attention of modern entomologists as some of the other groups of insects, but still its investigation has not been stationary amongst us. The laborious researches of Messrs. Edwards and Audouin relative to the internal anatomy of some of the larger species [2] are amongst the most valuable works of the kind hitherto published. Nor must the dissections of the Lobster by our own celebrated comparative anatomist Mr. Owen, recently published [3], be passed over in silence. M. De Haan of Leyden has undertaken the description of the *Crustacea* of Japan [4], and the introductory portion of his work

[1] Suites à Buffon, formant, avec les Œuvres de cet Auteur, un Cours complet d'Histoire Naturelle, Collection accompagnée de Planches. 8vo. Paris, Roret. The following are the names of the entomological authors, and their respective portions of the work: Serville (Orthoptera, Neuroptera, Hemiptera), Boisduval (Lepidoptera), De Jean (Coleoptera), Lacordaire (Introduction), Macquart (Diptera), Milne Edwards (Crustacea), Saint Fargeau (Hymenoptera), Walckenaer (Arachnida and other apterous insects). Each portion is complete in itself, and is no ways connected with any of the works of Buffon.

[2] Mémoires pour servir à l'Histoire Naturelle des Crustacés. Par MM. Audouin et Milne Edwards. Paris, 1829. 8vo. Being a collection of memoirs previously published in the Annales des Sciences Naturelles.

[3] In the Descriptive Catalogue of the Museum of the College of Surgeons. London, 1834.

[4] Fauna Japonica, sive Descriptio Animalium quæ in Itinere per Japoniam collegit Ph. Fr. de Siebold. Auct. W. De Haan pro Invertebratis. Lugduni Batavorum, 1833. Folio. With plates.

promises to be of great value, as regards the classification and distribution of the species, and in which the quinarian system is adopted. The first part of a treatise upon this class by Milne Edwards[1] has lately appeared in Paris, which will form a standard work of reference when completed. The indefatigable Dr. Johnston of Berwick-upon-Tweed has from time to time published isolated descriptions of rare or unknown animals belonging to this class in the late numbers of the Magazine of Natural History; whilst a valuable memoir upon the natural history of that destructive animal the *Limnoria terebrans*, from the pen of Mr. Coldstream, appeared in 'Jameson's Edinburgh Philosophical Journal' of last year. But the subject of the highest interest connected with this class, is that of the transformations which these animals have universally been asserted to undergo in their early age, contrary to the generally received opinion that the *Malacostraca* are not subject to metamorphoses. The singular facts relative to this subject published by Mr. J. V. Thompson of Cork[2], (amongst which the most remarkable is the statement that some of the animals composing the extraordinary genus *Zoëa* are in fact only the young of the common edible Crab,) are sufficient, if the correctness of them shall be established, to place this author in the foremost ranks of science; but it is to be observed, that the elaborate researches of Rathke upon the development of the eggs of the Cray-fish[3] and of the common *Asellus aquaticus*[4], the observations of M. Milne Edwards in the work above alluded to as well as in several of his detached memoirs, and those of Mr. J. E. Gray lately read before the Royal Society, relative to the transformations of the Cirripedes, tend to throw some doubt upon the statements of Mr. Thompson. The subject was considered worthy of a place amongst the zoological queries by the British Association at Cambridge; and the Zoological Society of Dublin have likewise adopted the same inquiry as one of the subjects for the prize essays which they have proposed. It is to be observed, however, that the correctness of Mr. Thompson's observations upon the transformations of the Cirripedes has found a supporter in Dr. Burmeister[5], who is thus opposed to Mr. J. E. Gray, and that Dr. Nordmann has ascertained the transformations in that remarkable group of animals the *Lernææ*[6]. Mr. Thompson has likewise sub-

[1] Histoire Naturelle des Crustacés, comprenant l'Anatomie, la Physiologie et la Classification de ces Animaux. Par M. Milne Edwards. Vol. I. Paris, 1834. 8vo. With an atlas of plates, forming portion of the Suites à Buffon.

[2] Zoological Researches and Illustrations on Natural History of Nondescript or imperfectly known Animals, in a Series of Memoirs, illustrated by numerous Figures. By J. V. Thompson, Esq., F.L.S. 8vo, Nos. 1—5. Cork, 1828—1834.

[3] Untersuchungen über die Bildung und Entwickelung der Flusskrebses. Folio. Leipzig, 1829. With plates.

[4] Abhandlungen zur Bildungs ant Entwickelung Geschichte der Menschen und der Thiere. 4to, Leipzig. 1832—1833. With plates.

[5] Beitrage zur Naturgeschichte der Ramkenfusser (Cirripeda). Von H. Burmeister. Berlin, 1834.

[6] Mikrographische Beitrage zur Naturgeschichte der Wirbellosen Thiere. Von Dr. Alex. v. Nordmann. Berlin, 1832. 4to. With plates.

Dr. Burmeister of Berlin has likewise published a valuable Memoir upon the

mitted to our Society an account of the larvæ of *Lepas anatifera*, a more detailed account of which has been laid by him before the Royal Society. A valuable report by M. Isid. Geoffroy St. Hilaire, upon a memoir by M. Edwards, entitled 'Observations sur les Changemens en forme que les Crustacés éprouvent dans le jeune age [1],' must also be noticed.

Various isolated memoirs have also been recently published upon this class of animals, as that of Latreille upon the genus *Prosopistoma* [2]; of M. Guérin upon the *Notopoda* [3], a curious group of Crabs; upon *Isæa*, a genus of Hermit Crabs; and upon the Glass Crabs *Phyllosoma* [4]; of M. Polydore Roux upon the Shrimp family *Salicoques* [5]; of M. Edwards upon the order *Amphipoda* [6]; of M. Brandt upon the *Oniscidæ* [7]; of M. Roussell de Vauzeme upon the Whale Louse, *Cyamus Ceti* [8]; together with the description of the curious osculant genus *Praniza*, published by myself in the 'Annales des Sciences Naturelles' [9].

The extraordinary œconomy and organization of the Opossum and Brine Shrimps, *Mysis* and *Artemia*, have been detailed by Mr. Thompson in different numbers of his 'Zoological Illustrations'. And M. Savigny's remarkable doctrine of the transformation of certain parts of the mouth into organs of locomotion, and *vice versâ*, has received fresh confirmation in the memoirs of M. Edwards upon the genera *Sergestes*, *Acetes*, *Sicyonia*, and *Thysanopoda*. The same author has also published no less valuable memoirs upon the remarkable genera *Glaucothoe*, *Pontia*, *Cuma*, *Nebalia*, *Thysanopoda*, *Amphion*, and *Rhæa*, in various numbers of the 'Annales des Sciences Naturelles', and the 'Annales de la Société Entomologique de France'. The same author has more recently published a memoir on the structure of the mouth of the siphonostomous *Crustacea* [10]; and has also, in conjunction with M. Audouin, described a very minute and singular parasite found not uncommonly attached to the branchiæ of the common Lobster, and to which they have given the name of *Nicothoe Astaci* [11]. We are indebted to Dr. Gruithuisen for a memoir upon the anatomy of *Daphnia Sima* [12]. Dr. Leach has also published descriptions of some new genera of *Crustacea* in the Transactions of the Plymouth Institution for 1830; and Dr. Zeneker is the author of

Caligi and other Parasitic Crustacea in the last part of the Nova Acta Cæsareo Leop. Naturæ Curiosorum.

[1] In the Ann. des Sc. Nat., December 1833.

[2] In the Nouvelles Annales de Muséum d'Histoire Naturelle, Vol. II. 1834, 4to.

[3] In the Annales des Sciences Naturelles for March, 1832.

[4] In the Annales de la Société Entomologique de France, Vol. I. No. 3.

[5] Mémoire sur la Classification des Crustacés de la Tribu des Salicoques. Par Polydore Roux. Marseille, 1831. 8vo. pp. 39.

[6] In the Annales des Sciences Naturelles for November 1830.

[7] Conspectus Monographiæ Crustaceorum Oniscodorum Latreillii, in the Bulletin Soc. Imp. des Nat. de Moscou, Tom. VI. 1833, p. 170.

[8] In the Annales des Sc. Nat. for April and May 1834.

[9] In the same work for November 1832.

[10] In the Ann. des Sc. Nat., January 1833, Tom. XXVIII. p. 87.

[11] In the Ann. des Sc. Nat. for 1826, Tom. IX. p. 345.

[12] In the fourteenth volume of Nova Acta, &c. for 1828.

an elaborate treatise upon the *Gammarus Pulex*, in which the circulation of the blood has been perceived[1].

We look forward also with interest to Captain James Ross's publication of the *Crustacea* brought home in the last Northern Expedition, as well as to the result of Mr. W. Baird's examination of the *Entomostraca* of Berwickshire. Our own Society has not been entirely destitute of observations upon this class; being indebted to Lieut.-Col. Sykes and Mr. Sells for some verbal communications relative to the natural history of the Land Crabs of the East and West Indies, and I have submitted to you a memoir upon the characters and affinities of the osculant genus *Arcturus* of Latreille[2].

The class Arachnida has, in like manner with the former, met with but little favour from the majority of entomologists, few having undertaken its investigation; still our list is by no means destitute of interest.

The classification of the great typical order of Spiders has recently undergone revision by the most celebrated of arachnologists, Baron Walckenaer[3], whilst M. Dufour has described various species, natives of Europe[4], and M. Lucas, one of the zoologists employed at the Jardin des Plantes, has published the descriptions of various curious exotic species in different numbers of the 'Annales' of the French Entomological Society. M. Hahn has commenced the publication of a work containing beautiful illustrations of the species of Arachnida[5]. In England Mr. Blackwall has much increased the knowledge of the habits of the indigenous groups, adding also various new genera and species to our lists[6]; and an anonymous author in the Mag. of Nat. Hist. has commenced the publication of a series of articles upon the Spiders, in which great talent is displayed. The absence of this gentleman from England has prevented the continuance of the publication of his researches, but as his return is shortly expected, it is to be hoped that no further delay will take place, since his illustrations (as I can affirm from an inspection of them,) are of a very high character. M. Audouin has published an interesting memoir upon the nest of one of the burrowing Spiders[7]; and Mr. Sells has had the kindness to present our Society with a specimen of a similar nest from the West Indies. Mr. W. S. MacLeay has likewise published a

[1] De Gammari Pulicis Fabr. Historia Naturali atque Sanguinis Circuitu Commentatio. Auct. J. C. Zeneker. Jenæ, 1832. 4to.

[2] Since this Report was read, several curious species, collected by Mr. Hailstone, jun., on the southern coast of England, have been described in the Magazine of Natural History for May 1835.

[3] In the Annales de la Société Entomologique de France, Vol. II. No. 3.

M. Walckenaer has also lately commenced the publication of a work entitled 'Les Aranéides de France classées par leur Organisation', &c. (L'Institut, No. 53) quoted by Mr. Jenyns, Report on Zoology, p. 203.

[4] Annales des Sc. Phys. Brux., Tom. IV.; Ann. des Sc. Nat., Tom. II. et XXII.

[5] Die Arachniden-Getreu nach der Natur abgebildet und beschrieben. Von Dr. Carl Wilhelm Hahn. Nurnberg, 12mo, in parts, 1831—1835. With coloured plates.

[6] Linnæan Transactions, Vols. XV. and XVI.; and London and Edinburgh Philosoph. Mag., May 1833–34.

[7] In the Annales de la Société Ent. de France, Vol. II. No. 1.

memoir[1] upon the gigantic *Aranea avicularia*, in which he has disproved the statements of Madame Merian as to its capturing small birds in its webs, being in fact a terrestrial species living in holes under stones, &c. We are indebted to Latreille for a valuable memoir[2] upon the genus *Mygale*, to which this insect belongs.

Mr. Spence has also published some observations upon the construction of the geometrical nests of spiders, in the Mag. of Nat. Hist.[3].

The nature and properties of the immensely developed palpi of the male spiders is a question still left in obscurity, being one of the points of inquiry proposed amongst the zoological questions by the British Association[4].

Amongst the smaller and aberrant *Arachnida*, the memoir of M. Dugès upon the *Acari*[5] stands foremost, this author having not only detailed and illustrated the structure of the entire group, but also added considerably to our knowledge of the habits of the various genera, and having, for the first time, described the singular transformations which many of the species undergo, and which in the Water Mites is of so extraordinary a nature as to have deceived Latreille and Audouin. It is in justice to be observed, that Mr. Curtis had some time previously published a short notice relative to the latter subject in the Mag. of Nat. Hist.[6]. M. Theis has also published a monograph upon the *Hydrachnæ*, as well as one upon the genera *Chelifer* and *Obisium*[7].

The Rev. F. W. Hope has also read before the Linnæan Society the description of a most singular animal belonging to the family of the Harvest Spiders, *Phalangia*,—remarkable for the extraordinary elongation of its legs,—and which he has named *Dolichoscelis Haworthii*; and Dr. Perty has given a synopsis of the same family in his account of the insects of Brazil collected by Spix and Martius, in which numerous new genera are introduced.

Another subject connected with the *Acari*, which appears to have excited a great degree of attention in Paris, namely, the real nature of the itch insect, *Acarus Scabiei*, has very recently been elucidated by the publication of its description by the celebrated microscopic observer M. Raspail[8].

The recent publications and memoirs upon the other Apterous In-

[1] In the Transactions of the Zoological Society of London, Vol. I.

[2] Vues Générales sur les Aranéides à quatre Pneumobranchies, &c.; published in the Nouv. Ann. d'Hist. Nat., Tom. I. p. 61.

[3] No. 30, for November 1832.

[4] The curious question also as to the degree of value to be given to the characters derived from the nature of the respiratory apparatus in the Arachnida (respecting which see Mr. Jenyns's Report. p. 201,) has received fresh interest from a memoir by M. Dugés, recently read before the French Institute, in which the genera *Dysdera* and *Segestria* are stated to have four spiracles, two of which are connected with pulmonary and two with trachean organs.—See Guerin's Bull. Zool., No. 2.

[5] Recherches sur l'ordre des Acariens, Ann. des Sc. Nat., January 1834.

[6] Mag. Nat. Hist., Vol. VII. pl. 161.

[7] Ann. des Sciences Naturelles, September 1832.

[8] Mémoire Comparatif sur l'Histoire Naturelle de l'Insecte de la Gale. Par F. V. Raspail. Paris, 8vo, pp. 31. With plates.

sects of Linnæus may be briefly noticed. Descriptions of numerous species of *Anoplura* and *Pediculi* have appeared in Lyonnet's posthumous work, illustrated by beautiful figures[1]; whilst Dr. Leach has published the descriptions of several new species, and a new genus named *Euopus*, belonging to the *Iulidæ*[2].

A valuable illustrated memoir upon the *Thysanura* of Ireland has been read before our Society from the pen of Mr. Templeton, in which many new objects are described; whilst the same order of insects formed the subject of one of the latest memoirs from the pen of Latreille[3].

Mr. J. E. Gray has published the descriptions of some new genera of *Iulidæ* in Griffith's Animal Kingdom[4]; and a monograph by Dr. Brandt upon the same group appeared in the last volume of the Bulletin of the Natural History Society of Moscow[5].

The genus *Pulex*, composing the order *Aphaniptera* of Kirby, has formed the subject of an elaborate memoir by M. Dugès, by whom the real analogues of two pairs of wings have been discovered[6]. The structure of the antennæ of the different species has been noticed by me in a memoir in the Entomological Magazine[7].

On arriving at the great group of true Metamorphotic Winged Insects, we find the subject to be so extensive as to require not only a generalized view, but also one extending to each of the orders; indeed it will be at once perceived how impossible it is to notice, even in the shortest manner, many interesting memoirs containing the descriptions of isolated species. This must be my excuse if I should appear to have overlooked the labours of any author.

Various valuable works have lately appeared in which the organization and classification of insects in general have been detailed: of these may especially be mentioned the works of Stephens and Curtis above noticed; the 3rd and 4th volumes of the 'Introduction to Entomology', by Messrs. Kirby and Spence; the 4th and 5th volumes of the 'Règne Animal' (of Cuvier), from the pen of Latreille; the 'Cours d'Entomologie', by the same lamented author; the 'Introduction à l'Entomologie', by M. Lacordaire, forming one of the volumes of the 'Suites à Buffon'; the 'Handbuch der Entomologie', by Dr. Burmeister[8]; the 10th volume of the 'Encyclopédie Méthodique'. The 'Genera des Insectes', of MM. Guérin and Percheron, and the 'Bulletin Zoologique' of M. Guérin, are also works of much

[1] Recherches sur l'Anatomie et les Métamorphoses de différentes Espèces d'Insectes, ouvrage posthume de Pierre Lyonnet. Parts I. and II. 4to. Paris, 1832. With 54 Plates. From the Mém. du Mus. d'Hist. Nat., Vol. XVIII. XIX. XX.

[2] In the Transactions of the Plymouth Institution for 1830. 8vo.

[3] In the Nouvelles Annales du Muséum d'Histoire Naturelle, Tom. I. p. 161.

[4] Pl. 135.

[5] Bulletin de la Société Impériale des Naturalistes de Moscou, Tom. VI. 8vo. 1833, p. 194.

[6] In the Ann. des Sc. Nat., October 1832.

[7] Vol. I. No. 4. p. 359.

[8] Mr. Shuckard has commenced the publication of a very neat and cheap translation of this valuable work under the name of a Manual of Entomology, 8vo, London, E. Churton: in monthly numbers, with plates.

value. The little Manual of Mr. Newman[1], as well as the 'Entomological Cabinet' of Mr. Samouelle, will also assist in calling the attention of the public to our science.

The completion of the splendid work of Dr. Perty[2] upon the insects of Brazil, and that of Dr. Klug upon the insects of Arabia[3], &c. are also especially to be noticed, as well as the series of observations upon the œconomy of the insects of South America, published by M. Lacordaire in the 'Annales des Sciences Naturelles', 'Annales de la Société Entomologique de France', and 'Nouv. Annales de Muséum d'Histoire Naturelle'; the entomological portion of the great national French work upon the Morea, from the pen of M. Brullé; and the work of M. Boisduval upon the insects of Madagascar, New Holland, and other islands of the Southern Ocean. Two works are in course of publication in Germany forming Supplements to Panzer's great work[4].

The general principles regulating the distribution of insects have lately attracted considerable attention amongst us. Dr. Horsfield in his 'Lepidoptera Javanica', and Mr. Stephens in the Introduction to his Systematic Catalogue, have proposed arrangements, founded upon the views developed in that extraordinary work the 'Horæ Entomologicæ'; whilst, on the other hand, Mr. Swainson has arrived at several conclusions differing from those of Mr. MacLeay, and which he has especially illustrated in his Zoological Illustrations and the introductory treatises to the Natural History portion of Dr. Lardner's Cabinet Cyclopædia. Mr. Newman also has adopted a still different series of ideas, which he has developed in his ingenious treatise entitled 'Sphinx Vespiformis', which have, however, met with some opponents, whose observations are published in the Entomological Magazine[5].

The investigation of the natural history of insects, as illustrated by their preparatory states, has attracted a considerable share of attention amongst modern entomologists. A volume devoted exclusively to this branch of the science has recently appeared in Germany from the pen of M. Bouché[6], in which the larvæ and pupæ of a very great number of insects of various orders are described.

Much discussion has lately taken place amongst naturalists relative to the circulation of blood in insects, of which remarkable fact, as exhibited in the larvæ of certain *Neuroptera*, an announcement was made by Carus at the German meeting of naturalists at Dresden in

[1] The Grammar of Entomology. By Edward Newman. 12mo. With 4 Plates.

[2] Delectus Animalium Articulatorum quæ in itinere per Brasiliam, annis 1817–1820, colligerunt Spix et Martius digessit, &c. Dr. Max. Perty. Fasc. 1—3. Monachii, 1830. Folio. With coloured plates.

[3] Symbolæ Physicæ, seu Icones et Descriptiones Corporum Naturalium ex itineribus per African Borealem et Asiam Occidentalem. Berlin, folio. Insects, Dec. 1—4, 1828—1834.

[4] Fauna Insectorum Europæ, Fasc. 1—15; Halæ, 12mo.: the early numbers were published by Ahrens. And, Deutschlands Insecten von Panzer fortgezetz von Schaeffer, 12 livraisons, 12mo. Each with 24 plates.

[5] Vol. I. p. 224.

[6] Naturgeschichte der Insekten. Berlin, 1834. 8vo. With outline plates.

1826[1]. A paper has appeared by Mr. Bowerbank in the Entomological Magazine, vol. i. p. 239; and a memoir by Mr. Tyrrel upon this subject has also been recently read before the Royal Society.

Of works devoted to the anatomy, external and internal, of insects, we have especially to notice the posthumous work of Lyonnet above referred to, in which his great work on the Cossus is rendered complete by the publication of the dissections of the pupa and imago. The admirable work of M. Straus Durckheim[2] (second only to that of Lyonnet) upon the Cockchaffer, *Melolontha vulgaris*, is highly important, illustrating the Coleopterous order as that of Lyonnet does the *Lepidoptera*[3]. The Hornet, as an example of the *Hymenoptera*, has also been treated in like manner; but an analysis only of the latter has as yet appeared in the 'Bulletin des Sciences Nat.' for 1830[4], and in Cuvier's 'Analyse des Travaux' for the same year.

Mr. MacLeay also has published an elaborate memoir upon the Structure of the Thorax, in the Zoological Journal[5], which memoir has since been translated into French and published by M. Audouin, with additional observations, in the 'Annales des Sciences Naturelles'[6]. Mr. Newman has also published some osteological sketches in various numbers of the Entomological Magazine.

The numerous memoirs of M. Dufour (published chiefly in the 'Annales des Sciences Naturelles'), Heroldt, Müller, Carus, Suckow, Treviranus, and others, as well as the important memoir of Mr. Newport upon the internal anatomy of the *Sphinx ligustri*, published in the Transactions of the Royal Society for the last year, are all of great value, and cannot fail to place this intricate part of the subject upon a firm basis.

I now proceed to the order Coleoptera, which has been more extensively cultivated by modern entomologists than any other group of insects.

Of works upon this order in general Dr. Klug has had the kindness to forward to our Society a memoir published by himself, containing descriptions and numerous figures of the *Coleoptera* of Madagascar[7]. The second edition of the Catalogue of the Collection of the Count DeJean has been in part published; and Dr. Perty has issued a notice of the *Coleoptera* of the East Indies[8].

[1] See also his memoir in the Nova Acta Nat. Cur., Vol. XV. Pt. II.; his Entdeckung eines Einfachen, &c. with 3 plates. Leipzig, 1827. And his memoir in the Isis, 1828, p. 477.

[2] Considérations générales sur l'Anatomie comparée des Animaux articulés; auxquelles on a joint l'Anatomie descriptive du *Melolontha vulgaris* (Hanneton), donnée comme exemple de l'organisation des Coléoptères. Paris, 1828. 4to.

[3] A full abstract of the general considerations and laws to which M. Straus has, in his introduction, endeavoured to refer the different modifications of structure undergone by the various organs in different groups of articulated animals, has been given by Mr. Doubleday in the Entomological Magazine, Vol. I.

[4] Tom. XXII. p. 347.

[5] Zoological Journal, No. 18. Vol. V. p. 145.

[6] January and February 1832.

[7] From the Abhandlungen der Königlichen Akademie der Wissenschaften zu Berlin aus dem Jahre 1832.

[8] Observationes nonnullæ in Coleoptera Indiæ Orientalis. Auct. Dr. Max. Perty. Monachii, 1831. 4to. With 1 plate.

The first portion of a work[1] containing the descriptions of the *Coleoptera* found in the neighbourhood of the Scottish capital has been published. The first part of the entomological portion of the 'Naturalist's Library' of Sir Wm. Jardine is in the press, in which a great variety of showy *Coleoptera* are figured[2]. And the publication of Sturm's valuable little 'Deutschlands Insecten Fauna' has recently been recommenced.

The Rev. F. W. Hope has described, not only in our own Transactions, but also in those of the Zoological Society, numerous remarkable novelties belonging to this order. He has likewise published an account of the various species of Beetles found in mummies[3]; whilst Mr. Waterhouse has laid before the Society the descriptions of numerous Coleopterous larvæ, a branch of the subject of the highest interest. Mr. S. S. Sanders has also described various remarkable exotic *Coleoptera* at one of our meetings, belonging to various genera.

Carabidæ.—Following in the steps of the Baron DeJean, the completion of whose descriptions of the *Carabidæ* and *Cicindelidæ*[4] has recently taken place, we find Messrs. Gory[5], Laporte[6], Brullé[7], Klug[8], and Chevrolat[9] giving descriptions of supplementary species of the same family, whilst descriptions of the *Carabidæ* of New Holland may shortly be expected from the pen of Mr. G. R. Gray. Mr. Say has also published a recent memoir upon the American species of these two families[10]. Descriptions and figures of the European species of these families are in course of publication by Dejean and Boisduval[11]. Zimmerman also has published two monographs upon *Zabrus* and *Amara*

[1] Entomologia Edinensis. By James Wilson, F.R.S., and Rev. James Duncan. 8vo. Edinburgh, 1834.

[2] Since this Report was read, this work has been published with the title 'The Natural History of Beetles, illustrated by thirty-two plates, numerous wood-cuts; with memoir and portrait of Ray. By James Duncan, M.W.S. Edinburgh, 1835.'

[3] In the History of Egyptian Mummies, &c. By Thomas Jos. Pettigrew, F.R.S., &c. London, 1834. 4to. With plates.

[4] Species général des Coléoptères de la Collection de M. le Comte De Jean. Paris, 8vo, Vol. 1—5, 1825—1831.

[5] Centurie de Carabiques nouveaux. Par M. Gory, Ann. Soc. Ent. Paris, Vol. II. p. 168.

[6] Etudes Entomologiques, ou Descriptions d'Insectes nouveaux et Observations sur leurs Synonymes. Par M. De Laporte. 1er et 2me Livraisons. Paris, 1834–1835. 8vo. With Plates.

[7] Observations Critiques sur la Nomenclature des Carabiques in Silbermann's Revue Entomologique, Livr. 9; and in the 4th Vol. of Histoire Naturelle des Insectes. Par Messrs. Audouin and Brullé. 8vo. With an atlas of plates. Paris, Pillot, 1834.

[8] Jahrbucher der Insectenkunde, von Dr. Fr. Klug. Erster band, 1834. 8vo. 296 pp. With 2 coloured plates.

[9] Coléoptères du Mexique. Par A. Chevrolat. 2nd Fascicule, 1834. Strasbourg, 12mo.

[10] Descriptions of some new North American Insects, and observations on some already described. By Thomas Say, in the 4th Volume of the Transactions of the American Philosophical Society, New Series.

[11] Iconographie et Histoire Naturelle des Coléoptères d'Europe. Paris, 8vo. With plates. Published in Livraisons 1827—1835.

and their respective divisions [1]. The attention of our Society has been called to the specific distinctions of various British species of the genus *Dromius* by Mr. Babington.

Dyticidæ.—The family of the Water Beetles, *Dyticidæ*, has been revised by Dr. Erichson [2], who has added several new generic groups, and also, together with the *Gyrinidæ*, by M. Laporte in his 'Etudes Entomologiques' above mentioned.

Hydrophilidæ.—M. Solier has undertaken the revision of the *Hydrophilidæ* in the 'Annales' of the Entomological Society of France [3]: and Mr. Waterhouse has published a monograph upon one of the genera, *Hydræna*, in which numerous new British species are described [4].

The *Brachelytra*, or Linnæan *Staphylini*, have been submitted to a minute analysis by the Count De Mannerheim, whose memoir has been published in the Transactions of the Petersburgh Academy [5]; and Dr. Gravenhorst, one of our Honorary Members, has announced to us his intention of again directing his attention to the same group. M. Laporte has also published descriptions of various new exotic genera and species in the 2nd part of his 'Etudes Entomologiques'. The curious little family *Pselaphidæ* has formed the subject of a valuable and recent monograph by M. Aubé, published in Guérin's Magasin de Zoologie, in which highly magnified figures of all the species are given [6], forming a fit companion to Mr. Denny's monograph upon the same family.

The *Histeridæ* have been revised by Dr. Klug in his Jahrbucher, and not less than twenty-one genera have been proposed in the family, and a very great number of species described. The family *Lucanidæ* has recently received several splendid additions, including the *Chiasognathus Grantii* of Mr. Stephens [7], and several other new genera, of which I have given characters in the 'Annales des Sciences Naturelles [8]', accompanied by a synoptic table of the entire family. M. Percheron has just published a monograph upon the exotic genus *Passalus* [9], containing not less than fifty species. Mr. Waterhouse made a verbal communication at one of our early meetings upon the habits of the common Stag Beetle. Numerous additions have been made to the great Linnæan group of *Scarabæus*, especially in the 'Encyclopédie Méthodique,' vol. x.; and Messrs. Gory and Percheron have

[1] Monographie der Carabiden, von Zimmermann; Erstes Stuck: 8vo, Berlin and Halle, 1831. Containing the Zabroides. The Amaroides form the subject of a memoir in the first number of the Faunus, von J. Gistl, Munchen, 1832.

[2] Genera Dyticeorum Dissertatio inauguralis. Auctore Dr. G. F. Erichson. Berolini, 1832. 8vo, pp. 48.

[3] Vol. III. Part II.

[4] Entomological Magazine, Vol. I. p. 292.

[5] Mém. présentés à l'Acad. Imp. Sc. St. Pétersbourg, Tom. prem. 5me Livraison, 1831.

[6] Plates 78—93.

[7] Cambridge Phil. Soc. Trans., Vol. IV. Pl. 9, 10.

[8] 2nd Series, February 1834.

[9] Monographie des Passales et des Genres qui en ont été séparés, &c. Par A. Percheron. Paris, 1835. With outline figures of all the species.

undertaken a beautifully illustrated monograph of the family *Cetonidæ*[1], which is now in course of publication.

The splendid family *Buprestidæ* has been enriched with some singular species from Madagascar[2], and has been revised by M. Eschscholtz[3] and M. Solier[4], each of whom have added numerous generic groups.

The *Elateridæ* have in like manner been revised by Eschscholtz[5] and by Latreille[6], whilst the *Rhipiceridæ*[7] and *Lampyridæ*[8] have been submitted to similar treatment by M. Laporte.

M. Solier has undertaken the difficult task of illustrating the *Heteromera*, and his first memoir, published in the Annals of the French Entomological Society[9], affords promise of great value. Eschscholtz likewise added many new genera belonging to the *Melasoma* in the 'Zoologischer Atlas' above noticed; and M. Guérin has more recently commenced the task of illustrating the same division in his 'Magasin de Zoologie'. I need not do more than name the nearly completed work of Schönherr upon the *Curculionidæ*[10], a family supposed to be connected with the *Cerambycidæ* by a series of Xylophagous insects, portions of which, belonging to the family *Cucujidæ*, I have submitted to a minute examination, the result of which has been published in the Zoological Journal[11].

Whilst, in the last place, the distribution of the *Cerambycidæ* given by M. Serville in various numbers of the Annals of the French Entomological Society[12] cannot fail to be of essential benefit.

Strepsiptera.—Our attention has very recently been called to the very rare and interesting group of parasitic insects *Strepsiptera*, of which a very decided new species, named *Stylops Spencii* (in honour of one of our distinguished honorary members), has been described, and its habits detailed to us by Mr. Pickering. Two other new genera, *Elenchus* and *Halictophagus*, have been published in Mr. Curtis's 'British Entomology'.

Hymenoptera.—The highly interesting order *Hymenoptera* has lately attracted much of the attention of entomologists, and it is understood that a general work upon the order by the Count de St. Fargeau will shortly appear in Paris.

Dr. Klug has recommenced his memoirs upon the *Tenthredinidæ* in the 'Jahrbucher der Insectenkunde' above noticed; whilst the great

[1] Monographie des Cétoines et genres voisin. Par Messrs. Gory et Percheron. Paris, 1833—1835. 8vo. With coloured plates.

[2] Figured at the same time and under different names by M. Guérin in his Magasin de Zoologie, and by Dr. Klug in his account of the Madagascar Coleoptera.

[3] Zoologischer Atlas. Von Dr. Fr. Eschscholtz. Erstes Hefte. Folio, 1829. Berlin.

[4] Ann. Soc. Ent. de France, Vol. II. Pt. II.

[5] In Thon's Entomologisches Archiv for 1829.

[6] Ann. Soc. Ent. de France, Vol. III. Pt. I.

[7] *Ib.* Vol. III. Pt. II. [8] *Ib.* Vol. II. Pt. I. [9] *Ib.* Vol. III. Pt. III.

[10] Synonyma Insectorum Genera et Species Curculionidum. Paris, 1833–1834.

[11] No. 18. p. 213.

[12] Vol. I. Pt. II. (Prionidæ) Vol. II. Pt. IV. and Vol. III. Pt. I. (Cerambycidæ).

work of Gravenhorst upon the true *Ichneumones*[1] will not easily be surpassed.

The *aberrant Ichneumonidæ* have been described by Dr. Nees von Esenbeck[2]; and Mr. Haliday[3], whose lucid details have thrown great light upon this abstruse part of our science, has entered the same field. A generic distribution of the Gall-flies has been published by me in the Mag. Nat. Hist.[4], where I have described several new species. M. Fonscolombe has also described numerous French species of the latter family in the 'Annales des Sciences Naturelles'[5]; and Dr. Hemmerschmidt of Vienna has published a valuable memoir upon this group of insects[6].

But the minute and splendid family of the *Chalcididæ* has perhaps received a greater share of the attention of recent Hymenopterologists than any other groups belonging to the order; Fonscolombe in France[7], Dalman[8], Bohemann in Sweden[9], Dr. Nees von Esenbeck in Germany[10], and Messrs. Walker[11], Haliday[12], and Curtis[13], as well as myself[14] having especially undertaken its illustration in various works.

The families of the Ants[15] and Wasps[16], notwithstanding their great interest, are both waiting for a monographer. The annoyances produced by a minute species of the former family have, upon several occasions, been noticed at our meetings; whilst the fossorial *Hymenoptera*[17] have been investigated with much care both by M. Vander-

[1] Ichneumonologia Europæa. Auctore J. G. C. Gravenhorst. Vratislaviæ, 1829. 3 Vols. 8vo.

[2] Hymenopterorum Ichneumonibus affinium monographiæ, Genera Europæa et Species illustrantes. Scripsit C. G. Nees ab Esenbeck. 2 Vols. 8vo. Stuttgartiæ et Tubingæ, 1834.

[3] Published in various Numbers of the Entomological Magazine.

[4] November 1833, Vol. VI. p. 491.

[5] For June 1832.

[6] Observationes Physiologicæ Pathologicæ de Plantarum Gallorum ortu Insectis qui excrescentia proferentibus. Vienna.

[7] Annales des Sciences Nat., July 1832.

[8] Stockholm Transactions (Köngl. Vetensk, &c., 1820—1822.

[9] *Ib.* 1833.

[10] In the Series of Monographs above referred to.

[11] In various Numbers of the Entomological Magazine. [12] *Ib.*

[13] In various Numbers of the British Entomology.

[14] Zool. Journal, No. 13; Magasin de Zoologie, Cl. 9. Pl. 4; Lond. and Edinb. Phil. Mag., Aug. 1832, June 1833, Nov. 1833; Mag. Nat. Hist., March 1833, September 1833, November 1833, March 1835; Proceedings Zool. Soc., April 1835; Ent. Mag., No. 7.

[15] A memoir by Signor Losana, 'Saggio sopra le Formiche indigene del Piemonte', in the Mem. delle Reale Acc. delle Scienze de Torine, Tom. XXXVII. 1834, must be excepted, as well as Col. Sykes's account of several Indian species read before the Society.

[16] The work of M. Wesmael, entitled 'Monographie des Odynères de Belgique', 51 pp. 1 Pl. Bruxelles, 1833, should be excepted.

[17] Since this Report was read, a valuable memoir by MM. Saint Fargeau and Brullé, upon the genus *Crabro*, has appeared in the 4th Part of the 3rd Volume of the Ann. Soc. Ent. de France.

linden[1] in Holland, and by our own member Mr. Shuckard, whose work upon the British species is on the point of publication. The latter gentleman has likewise read an interesting memoir upon the habits of this group, which has been published in the first part of our Transactions. Dr. Ratzburg has lately published a curious memoir upon the development of the segments in the apodal larvæ of the *Hymenoptera*, in which (if correct,) he appears to have arrived at some singular facts[2]. Mr. W. W. Saunders has likewise recorded some interesting facts relative to the œconomy of one of the East Indian species of this family, which has likewise been published in our Transactions. Little of novelty upon the family of the Bees has recently appeared either in the way of systematic classification or œconomical details, if we except the memoirs of the Count de St. Fargeau inserted in the 10th volume of the 'Encyclopédie Méthodique', and those upon *Bombus* by Dahlbom[3] and St. Fargeau[4].

Neuroptera, Trichoptera.—In like manner, but little novelty has appeared in the order *Neuroptera*[5]; but in the *Trichoptera*, or order of Caddice-flies, a splendid work has recently been published by M. Pictet of Geneva[6], and which has gained one of the prizes established by Lady Davy in the Academy of that city. Mr. Curtis has likewise published a series of short descriptions of numerous British species in the Philosophical Magazine[7]. Instances of the ravages of the *Termites*, or White Ants, have been brought under our notice by Capt. Smee and the Rev. Mr. Hope.

Orthoptera.—We are indebted to M. Serville for a revision of the order *Orthoptera*[8], in which numerous new generic groups have been proposed. The Count Fischer de Waldheim has likewise published a distribution of the Russian species in the last volume of the Bulletin of the Nat. Hist. Soc. of Moscow[9]; M. Zetterstedt[10] a monograph upon the *Orthoptera* of the North of Europe; and M. Phillipi a memoir upon the *Orthoptera* of Berlin[10]. I have already alluded to Mr. George R. Gray's monograph upon the *Phasmidæ* of Australia. The same author has likewise just completed an entire monograph upon the family, in which a great number of new genera and species are described[11].

[1] Observations sur les Hyménoptères d'Europe de la Famille des Fouisseurs. Par P. L. Vander Linden. 4to. Bruxelles, 1829.

[2] Ueber Entwickelung der fusslosen Hymenopteren Larven, in the Nova Act. Nat. Cur., Vol. XVI. Pt. I.

[3] Bombi Scandinaviæ. Small 8vo. [4] Annales Soc. Ent. France, Vol. I.

[5] The monographs upon the Libellulidæ, by Charpentier (Horæ Entomologicæ adjectis tabulis 9 col. Vratislaviæ, 1825. 4to.) and Vander Linden (Æshnæ Bononienses; Agriones Bononienses descriptæ a P. L. Vander Linden, adjecta tabula ænea, Bononiæ, 1820, et Monographia Libellularum Europæarum Specimen, Bruxelles, 1825,) must be excepted.

[6] Recherches pour servir à l'Histoire et à l'Anatomie des Phryganides. Par Fr. I. Pictet, Genève, 1834. 4to. With 20 plates.

[7] Lond. and Edinb. Phil. Mag., February and March 1834.

[8] Annales des Sciences Nat., January and March 1830.

[9] Orthoptera Sueciæ, Lund. 1832.

[10] Orthoptera Berolinensia. A small quarto pamphlet.

[11] Synopsis of the Species of Insects belonging to the Family *Phasmidæ*. By G. R. Gray, F.E.S. Lond. and France. London, 1835. 8vo, pp. 48.

Dermaptera.—In the order to which Dr. Leach applied the name of *Dermaptera*, M. Géné has published a monograph of the Italian *Forficula*[1], and I have read at one of our meetings some observations relative to the respiratory apparatus and sexual organization of the common species.

Heteroptera.—In the order *Heteroptera*, or the families of Land and Water Bugs, the elaborate memoir[2] of M. Dufour upon the comparative anatomy and internal organization of these insects is worthy of its distinguished author; the classification of M. de Laporte is also especially to be noticed, published in M. Guérin's Mag. de Zoologie[3], in which numerous new genera are proposed. The same groups have likewise formed the subject of valuable memoirs by Drs. Burmeister[4] and Schilling[5]. M. Hahn has also undertaken the pictorial illustration of the species in his elegant 'Die Wanzenartigen Insecten'[6]. Fallen also has again resumed his publications upon these groups[7]; and still more recently a memoir by myself upon several curious genera has appeared in the Annales of the Ent. Soc. France[8].

Homoptera.—In this order Dr. Germar has lately published a valuable synopsis[9], as well as a monograph upon the *G. Cicada*[10]. M. Guérin has in like manner published a partial synopsis of the order in his Account of the Voyage de Belanger. M. de Laporte has likewise characterized various remarkable exotic groups[11], whilst our own Transactions are enriched by a memoir of Mr. R. A. Lewis upon several new British genera. The ravages of the *Delphax saccharivora* upon the canes in the West Indies have in an especial manner been made the subject of attention by our Society.

The remarkable family of the *Coccidæ* has likewise been illustrated

[1] Saggio de una Monografia delle Forficule indigene de Prof. Giuseppe Géné. Padova, 4to, 1832. From 'degli Annali del Scienze del Regno Lombarde Veneto.'

[2] Recherches Anatomiques et Physiologiques sur les Hémiptères, accompagnées, de Considérations relatives à l'Histoire Naturelle et à la Classification de ces Insectes. Par M. Léon Dufour. 4to. Paris, 1833. Published in the Mémoires de l'Institut.

[3] Essai d'une Classification Systématique de l'Ordre des Hémiptères. Par F. L. de Laporte. Paris, 1833. 8vo. From the Magasin de Zoologie de Guérin.

[4] Mémoire sur la Division Naturelle des Punaises terrestres considérées surtout relativement à la Structure des Antennes. By Dr. H. Burmeister, in Silbermann's Revue Entomologique, Vol. II. No. 1. 1834.

Since this Report was read, Dr. Burmeister has published an entire revision of the Homoptera and Heteroptera in the 2nd Volume of his Handbucher der Entomologie.

[5] In the Beiträge zur Entomologie, 1 Heft, Breslau, 1829. 8vo. With 17 plates.

[6] Die Wanzenartigen Insekten. Von Dr. C. W. Hahn. Nuremberg, 1831—1835. Small 8vo. With plates.

[7] Hahn refers not only to the Hemiptera Succiæ, but also to a Monographia Cimicum by Fallen, which latter I have not seen. Burmeister refers to Fallen's Mon. Cim. Suec., Hafn. 1807; Spec. Nov. Hem., Lund. 1814; Hemipt. Suec., Lund. 1829, 8vo, fasc. I.—X.

[8] Vol. III. No. 3.

[9] Conspectus Generum Cicadariarum in Silbermann's Revue Entomologique, No. 4.

[10] In Thon's Entomologische Archiv, Vol. II. fasc. II. 1830, and in Silbermann Rev. Ent. No. 8.

[11] In the Annales Soc. Ent. de France, Vol. I.

by M. Fonscolombe[1], M. Géné[2], Dr. Brandt[3], and M. Bouche[4], in various valuable memoirs[5].

Lepidoptera.—In this beautiful order our continental neighbours have been making great advances. Two distinct and beautiful periodical works are now in progress of publication in Paris, devoted to the illustrations of the larvæ and pupæ of Europæan *Lepidoptera*[6]. Three also, in like manner, devoted to figures of the perfect insects, forming, in fact, supplements to the great works of Hübner and Godart, are in course of publication[7]. M. Boisduval has published a work upon the *Lepidoptera* of the islands of the Southern Ocean[8]. Mr. Swainson has illustrated numerous exotic groups of Butterflies in the New Series of his 'Zoological Illustrations.' Meigen has commenced an illustrated work upon the *Lepidoptera* of Europe; but perhaps the most valuable undertaking connected with this order is the *Microlepidopterology* of Count Fischer, of which the commencement has just appeared[9], in as much as the objects to which it is devoted, the *Tortricidæ* and *Tineidæ*, especially in their preparatory states, have most need of careful illustration. The beautiful work of Mr. Wood will be found exceedingly serviceable to the English Lepidopterist. Mr. Stephens has laid before the Society an account of

[1] In the Annales Soc. Ent. de France, Vol. III. Part II.

[2] In the Fauna del Regno di Napoli. 4to. With plates.

[3] In Mémoires Acad. Imp. Scienc. St. Pétersbourg. 6th Series. Vol. III. Liv. 1.

[4] Naturgeschichte der Insecten, Vol. I. 8vo. 1834. With plates.

[5] Dr. Burmeister has also, since this Report was read, published some very valuable observations upon this family in the 2nd Volume of his Handbucher; in which he has given an entire revision of the whole of the Suctorial Hemiptera, to which the Pediculidæ are added.

[6] Collection Iconographique et Historique des Chenilles: par MM. Boisduval, Rambur et Graslin, Paris, 8vo, Livr. 1—30. Iconographie des Chenilles: par M. Duponchel, Livr. 1—12, Paris, 8vo.

[7] Histoire Naturelle des Lépidoptères ou Papillons de France. Par Godart, continuée par M. Duponchel, Tom. I—XII. Paris, 8vo.—Supplément à l'Histoire Naturelle de Lépidoptères. Par M. Duponchel, Livr. 1—17. Paris, 8vo.—Icones Historiques des Lépidoptères nouveaux ou peu connus. Par le Docteur Boisduval. Livr. 1—30. Paris, 8vo.—M. Cantener has commenced a Histoire Naturelle des Lépidoptères Rhopalocères (knobbed-horned) des Départemens du Haut et du Bas-Rhin. Livr. 1—4. Paris.—Treitschke has begun a Hulfsbuch fur Schmetterlings Sammler. Vienne and Paris, 1834. With coloured figures. He has also completed the great work of Ochsenheimer 'Die Schmetterlinge von Europa.'—M. Freyer is also publishing a periodical work upon the Lepidoptera, with coloured plates, entitled 'Neuer Beitrage zur Schmetterlingskunde, &c. Dregsburg, 1—16 Hefte, each with 6 plates. —MM. Villiers and Guénée have undertaken a comprehensive work under the title of Tableaux Synoptiques des Lépidoptères d'Europe, which is announced as likely to form 8 Volumes, 4to.—M. Pocy's Centurie des Lépidoptères de l'Ile de Cuba, Paris, 8vo, commenced in 1832, must not be omitted.

[8] Faune Entomologique de Madagascar, Bourbon, Maurice; Lépidoptères par M. Boisduval. Large 8vo. M. Boisduval has also published a memoir upon the same subject in the Nouv. Ann. de Mus. d'Hist. Nat., Tom. II. No. 2. The same author has published a Monographie des Zygænides, including a Synopsis of Europæan Lepidoptera, 8vo, Paris, 1828; and, in conjunction with M. Lecomte, has commenced the publication of an illustrated work upon the Lepidoptera of North America; parts 11—22 have just been published in Paris.

[9] Abbildungen zur Berechtigung und Ergänzung Schmetterlingkunde besonders der Mikrolepidopterologie, &c. Von J. E. Fischer. 4to, in parts. Leipzig, 1834. With coloured plates.

the original specimen of the *Sphinx Ephemeræformis*[1] of Haworth, an insect which has much perplexed Lepidopterists, and which proves to be allied to *Psyche*, &c.; and our Transactions contain a memoir by myself upon a remarkable gregarious species of Butterfly, communicated to me by Mr. Rees, from Mexico.

Diptera.—In the order *Diptera*, if we except the ponderous work of Robineau Desvoidy upon the genus *Musca* of Linnæus[2], and the publication of M. Macquart's volume forming part of the series of the 'Suites à Buffon'[3], but little novelty of any extent has appeared since the completion of the works of Meigen[4] and Weidemann[5]. I must not, however, omit to mention Mr. Haliday's valuable memoir upon the *Dolichopidæ*, published in the Zoological Journal[6], as well as several detailed memoirs from the pen of the same gentleman and Mr. Walker, in various numbers of the Entomological Magazine, in which considerable additions have been made to our indigenous list. And lastly, Mr. Spence has laid before our Society several communications relative to the Hessian Fly and its parasites, upon which subject a memoir from the pen of Mr. Kerrick is expected.

I have at length brought this long list to a close, not I fear, however, before I have fatigued many of my hearers with the recital. I would willingly have compressed the subject into narrower limits; but this has been impossible, from the great number of invaluable works recently published upon the various branches of our science. One thing is certainly evident from what has been brought forward, namely, that the attention of many distinguished men has been especially devoted to Entomology, and great has been the result of their labours. But, gentlemen, how much remains still to be done—how boundless are those fields of pure and unalloyed delight in which the observer of nature may wander from "morn till dewy eve," plucking bright flowers at every step! The science which we cultivate is one not of names alone; we have living objects for our contemplation—and who will affirm that a single individual of all the ten or twelve thousand British species of insects has been thoroughly studied in all the various relations of its natural history and œconomy, internal and external anatomy, in its affinities and analogies, &c. Take, for instance, the very commonest of the insect tribes, the Domestic Fly, and how many interesting queries, including those suggested by Mr. Spence, might be proposed, to which not even the most skilful entomologist would be able to give a reply!

Truly, the harvest is plenteous—but let us hope that the labourers

[1] Index Entomologicus, &c., 8vo. With plates. By W. Wood, F.R.S., &c.

[2] Essai sur les Myodaires par le Docteur J. B. Robineau Desvoidy, 1830, 4to, pp. 812, being the 10th volume of the Mémoires présentés par divers Savans à l'Acad. Roy. des Sc. de l'Institut de France.

[3] Hist. Nat. des Ins. Diptères. Par M. Macquart. 8vo. Vol. I. Paris, 1834. With an atlas of plates.

[4] Systematische Beschreibung der bekannten Europaischer Zweiflugeligen Insekten. Von J. W. Meigen. Vol. I—VI. 1818—1830. 8vo.

[5] Aussereuropaische Zweiflugelige Insekten; beschrieben von Dr. Ch. R. W. Wiedemann. 2 Vol. 8vo. Hamm, 1828.

[6] No. 19.

are not few. The objects of our inquiry are within the reach of every one. It was, I think, St. Pierre who observed that several hundred distinct species of insects visited a rose-tree placed in the window of his study. And it was upon the leaves of trees growing within reach of his window that Evan Webster Lewis, whilst lying, even in the commencement of his career, upon a lingering bed of sickness,—from which, alas! he rose no more,—made those interesting observations upon *Tinea Ruficapitella* and *Pimpla Stercorator*, which while they soothed his painful hours, proved how valuable would have been his researches had he been spared to us.

There are also, I grieve to say, other names of those departed from us, who occupied the foremost ranks of our science, which cannot be mentioned without a sigh.

The merits of Cuvier, Latreille, Haworth, Guilding, and Say are so well known to every one of my hearers, and so immeasurably beyond my weak powers to accord justice to, that I dare not do otherwise than leave this part of my subject in your hands.

Indeed, it is time for me to conclude. Allow me, therefore, to thank you in the first place for the attention which you have bestowed upon this lengthened address; and in the second, for the honour which you have conferred upon me by re-electing me to the office of your Secretary. I could have wished that your choice had fallen upon an individual possessing greater capabilities than I can pretend to.

This much, however, I may safely affirm, that although others may far exceed me in talent, I will yield to no one in point of zeal either towards our favourite science or towards our Society as its organ. Indeed, I feel convinced that no one, considering the great influence which a Society, embodying the highest names of its students, must unquestionably have in promoting the extent and welfare of that science, will refuse to lay aside all trifling differences of opinion and join me in my most heartfelt wish, not only that Entomology may flourish, but also in the fervent exclamation,

Floreat Societas nostra, esto perpetua!

PRINTED BY RICHARD TAYLOR,
RED LION COURT, FLEET STREET.

AN ADDRESS

DELIVERED AT

THE ANNIVERSARY MEETING

OF THE

ENTOMOLOGICAL SOCIETY

OF LONDON,

JANUARY 24, 1842,

By W. W. SAUNDERS, Esq., F.L.S., &c.,

PRESIDENT.

LONDON:

PRINTED BY RICHARD AND JOHN E. TAYLOR,

RED LION COURT, FLEET STREET.

1842.

Anniversary Meeting of the Entomological Society of London, January 24, 1842.

Resolved—"That the thanks of this Meeting are due to the President for his Address, and that he be requested to allow the same to be printed for distribution amongst the Members of the Entomological Society."

J. O. Westwood,
Secretary.

ADDRESS.

This is the tenth year of the existence of this Society, which since its formation has been gradually advancing in public estimation, until it has gained the high station which it now holds among the scientific bodies of London. I would not wish to congratulate the members upon the position the Society has attained, unless I thought that there were ample reasons for so doing; but surely when I look to the character we have as a body, the number of members who have joined us, and the state of our collection and funds, I cannot but congratulate the members on the present state and prosperity of the Society.

Placed in the chair of this Society by no other merit of my own than that of being an ardent devotee at the shrine of Entomology, I do not wish that it should be thought that I am claiming any portion of the merit which attaches to those members who by their exertions have so much advanced the Society and the science in public estimation. They will, I am sure, feel rewarded for their trouble by seeing the Society so flourishing.

I have just alluded to the number of members who have joined this Society since its formation, and I am now happy to state that the number admitted last year is greater than for several seasons past; and I feel confident as we become more consolidated we shall find our ranks increase in proportion; and I look forward to the time when every entomologist in this country will have joined our ranks, and when all will strive together to promote the cause of the science which, above all others, each must have most at heart. The cash-balance in the Treasurer's hands shows a favourable state of our funds, and that our income is equal to the exigencies of the Society, with a surplus which I hope at our Anniversary Meetings never to

see diminished; for it is a very important point that this mainspring of the Society should always show a balance on the right side.

Considerable progress has been made in the arrangement of the Collection by the Subcurator and members who have kindly lent him assistance, and to whom the thanks of this Society are due for the trouble they have taken and time they have given towards forwarding this important object. I am anxious to see the Collection in as perfect a state as possible, as far as regards arrangement, in order that its riches may be better known and more easily referred to, feeling assured that a complete arrangement would have the effect of bringing members to the Society as well as acquisitions to the Collection itself. Some fine additions have been made to the Collection during the last year, for which the Society have most justly passed votes of thanks. To Miss Hope we are indebted for a very interesting collection of Egyptian insects, and to Mr. H. Cuming for the donation of a very valuable collection from Manilla, containing specimens of great rarity and extraordinary beauty. To Mr. M'Clelland and Dr. Cantor we are also indebted for collections from India and the neighbourhood of Chusan, each of much value to the Society, and showing the interest our corresponding members take in our welfare.

I must now advert to the loss the Society has sustained in the death of their late Subcurator, Mr. Bainbridge. He was a valuable servant to us, and had the interest of the Society much at heart. His knowledge of Entomology was very considerable; and this, combined with great zeal for the promotion of his favourite study, made him a most fit and proper person to fill the situation of Subcurator. By his amiable and unobtrusive manner he gained the good-will of all who knew him, and his loss will be long felt by his friends as individuals, and by this Society as a body. The Council have chosen Mr. F. Smith to fill Mr. Bainbridge's place, who is well known to many of the members of the Society for his excellent knowledge of British Hymenoptera; and I have every reason to believe that the choice they have made is one which will be very advantageous to the Society, and that they will have a very efficient officer.

During the last year the Council deemed it proper, at a small additional expenditure, to obtain the apartments which we now occupy, and which are far more commodious and advantageous to us than those we held before. We have now apartments which are well suited to the Society's wants; and having been recently papered, painted and

repaired, they have that appearance of respectability and cleanliness which I should wish the apartments of this Society to possess.

Since the last anniversary the Society has lost a member of great repute in the ranks of science in the person of A. B. Lambert, Esq., V.P.L.S., &c., who in a good old age has gone to that country from which no traveller returns. The particular bent of his studies was botany; but he fostered all the natural sciences, and was always ready to help those who were studying natural history, by giving them the use of the splendid collection he had formed at his residence in Grosvenor Street. It is not for me here to speak at large of the great benefits he rendered to the study of botany, of the splendid works which appeared under his fostering care, or of the riches of his magnificent collection. These will be duly dwelt upon by the President of another Society, where his loss is even more deeply felt.

I have also the melancholy task of recording the decease of our honorary foreign member, M. V. Audouin, so well known among the celebrated entomologists of France, and whose writings and exertions to forward the cause of Entomology are acknowledged with gratitude by the entomologists of every country. His great talents had raised him to a Professorship at the Jardin des Plantes, and he had filled the chair of the Entomological Society of France much to the benefit of that Society.

I must also say a few words as a tribute of respect to the memory of one who until lately had been a member of this Society, and who was so well known and respected among us—I allude to Mr. W. Sells of Kingston, who, in returning home from Guildford, was thrown from his gig, and died shortly afterwards of the injuries he received. He was a man devoted to the cause of science, and paid great attention to Entomology, particularly to the habits and economy of insects, to illustrate which he made a very interesting collection. In the last volume of our Transactions are several papers by Mr. Sells, which show the great attention he paid to Entomology, and the great aptitude he had for observation. The one on *Cteniza nidulans* is particularly interesting and valuable. Of his private character I have heard many excellent traits, and his charitable disposition and readiness to help those in distress will cause his loss to be much regretted in his neighbourhood, where he was looked up to by the distressed and afflicted as a benefactor and friend.

To turn from these melancholy subjects, I would wish to give a hasty glance at what has been done during the last year in this coun-

try for the cause of Entomology, in various publications which have no connexion with this Society. I am proud to say that one of our members, Mr. Newport, has laid before the Royal Society a paper on the development of the Myriapoda, in praise of which I have only need to say that it has been chosen by that Society as the Bakerian Lecture. I point out this as an example to those who would engage in the study of Entomology with a view to its advancement, and to show what may be done by talent and exertion. A great and wide field is open in Entomology for those to advance in who have time to give to this delightful study; and while some devote their minds to the nomenclature and natural classification of insects, there is ample room for others to render important services in other branches of the science. The 'Arcana Entomologica,' a very interesting and beautiful work, carried on by our talented Secretary Mr. Westwood, is a child of the last year, which will I hope live to a good old age; for I am ready to confess that the work is so full of important matter, so well illustrated, and so ably conducted, that I know of no entomological work of the present day which interests me so much. The 'Entomologist' is a small periodical established last year, and as its name imports, its pages are devoted to Entomology. It is ably conducted by Mr. Newman, a name well known in the entomological world, and many interesting papers on various subjects have appeared in it, and I think it is well worthy of the patronage of all who take an interest in Entomology, particularly the entomology of our own native land. A work in which the butterflies of Great Britain and their transformations are figured by Mr. Humphreys, and described by Mr. Westwood, was concluded last year, and the same gentlemen have entered upon another branch of the Lepidoptera, the British moths and their transformations; and I wish them success, as the character of the work they are publishing will do much to extend the study of Entomology, and make it far more popular than it has hitherto been. A volume on foreign moths from the hands of Mr. Duncan, assisted by Mr. Westwood, has appeared as one of the series of the Naturalist's Library; it is got up in the usual attractive and popular style of that well-conducted publication, and will, I have no doubt, obtain the same success as the volumes which have already appeared. Mr. Adam White, one of our members, has published a very interesting article on the insects of the north-west portion of New Holland, in the Appendix to Captain Gray's recent travels in that region. This paper does great credit to this rising entomologist, and will be found useful to those who are studying the insects of this little-known part of the

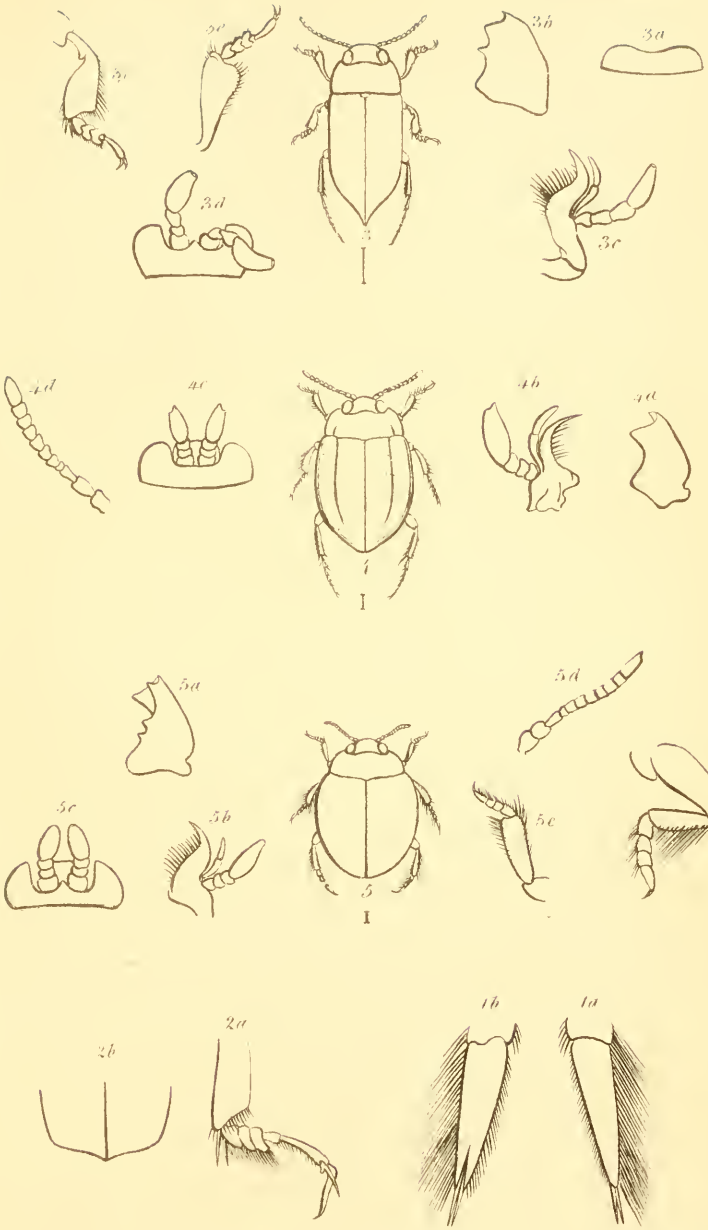
world. In the last part of the Transactions of the Linnean Society is a paper by the Rev. F. W. Hope, describing a number of very splendid insects from Assam in the East Indies, and illustrated by beautiful figures. The mere mention of this paper is all that is necessary on my part, as Mr. Hope's name as an entomologist is so well known, that anything from his pen requires no further comment. In the same part of these Transactions will be also found very interesting papers by Mr. Westwood and Mr. Blackwall; the former a Synopsis of the curious Coleopterous genus *Cerapterus*, and the latter on Spiders, pointing out how this portion of the animal kingdom may be divided into tribes from the number of the eyes, and also describing a new family and some new genera and species among the same class of animals. It would take me too long to detail the various papers which have appeared in different publications on the subject of Entomology during the last year; but there is one more which I must mention, a paper by Mr. J. Curtis in the Transactions of the Royal Agricultural Society, on the insects affecting the turnip crop. This is written with the usual care and ability of its well-known author, and is highly deserving of a place in the Transactions where it has appeared.

The publication of the Transactions of our own Society continues to progress, and the character of the Society is well kept up as far as regards the matter of what is published, and the manner in which the publication is brought out; but I should very much wish to see more than one part published yearly, and I shall venture to urge the propriety, if possible, of publishing two parts each year, one every six months. I think this might be managed by adopting the style of engraving employed in the last part, the expense of which is considerably reduced; and I have no doubt, if we published more frequently, it would have the effect of much increasing the number of our foreign members, who really at the present time receive little for their yearly subscription. Although we publish our Proceedings, by which means the labours of our members are brought immediately before the public, yet our papers are greatly accumulating, and it is quite evident that the publication of more than one part of our Transactions yearly is necessary to keep down the stock in hand, and bring them before the world, unless we allow an unwarrantable time to elapse between their being read at our meetings and their publication. If the funds of the Society will allow it, these reasons I think should induce us to publish more frequently, and I hope to find that the members will agree with me in the opinion I have formed.

The publication of the Proceedings, which I have just alluded to, is a very important event of the last year, and one which I am sure will do much for the Society, in securing many papers which would have appeared elsewhere, from the tardiness in which our Transactions appear. It could scarcely be expected that an author would give us important papers on nomenclature or classification, with a chance of their not appearing before the public for two or three years, and a probability of some other author in the mean time publishing on the same subject elsewhere and forestalling him in his labours. This could not be expected; and to remedy this the publication of the Proceedings was commenced, and happily accomplishes the desired object.

In concluding this short address, let me impress upon the members the great necessity of studying the useful and popular part of Entomology. Much remains to be done in this branch of the science, and much which can be accomplished by any one who has leisure, and a love to seek out Nature in her more secret recesses. The interest of our meetings, which are usually well attended, depends in a great measure on the exertions of members in bringing forward exhibitions and facts in this branch of study; and I trust that every member will exert himself in making our meetings interesting, and feel it a pleasing duty to lay before the Society any facts which may come to his knowledge tending to illustrate the habits and economy of insects. Those members who have so kept up the character of this Society by their papers and communications of various kinds, I wish to stimulate to still further exertions, that we may reap the result of their labours so necessary for our existence. From the united exertions of our members properly directed I foresee increasing prosperity; and on my own part I can safely say, that I shall spare neither exertion nor trouble to forward the views of the Entomological Society in every way that may lay in my power, and in every way do I wish it success.

Printed by Richard and John E. Taylor, Red Lion Court, Fleet Street.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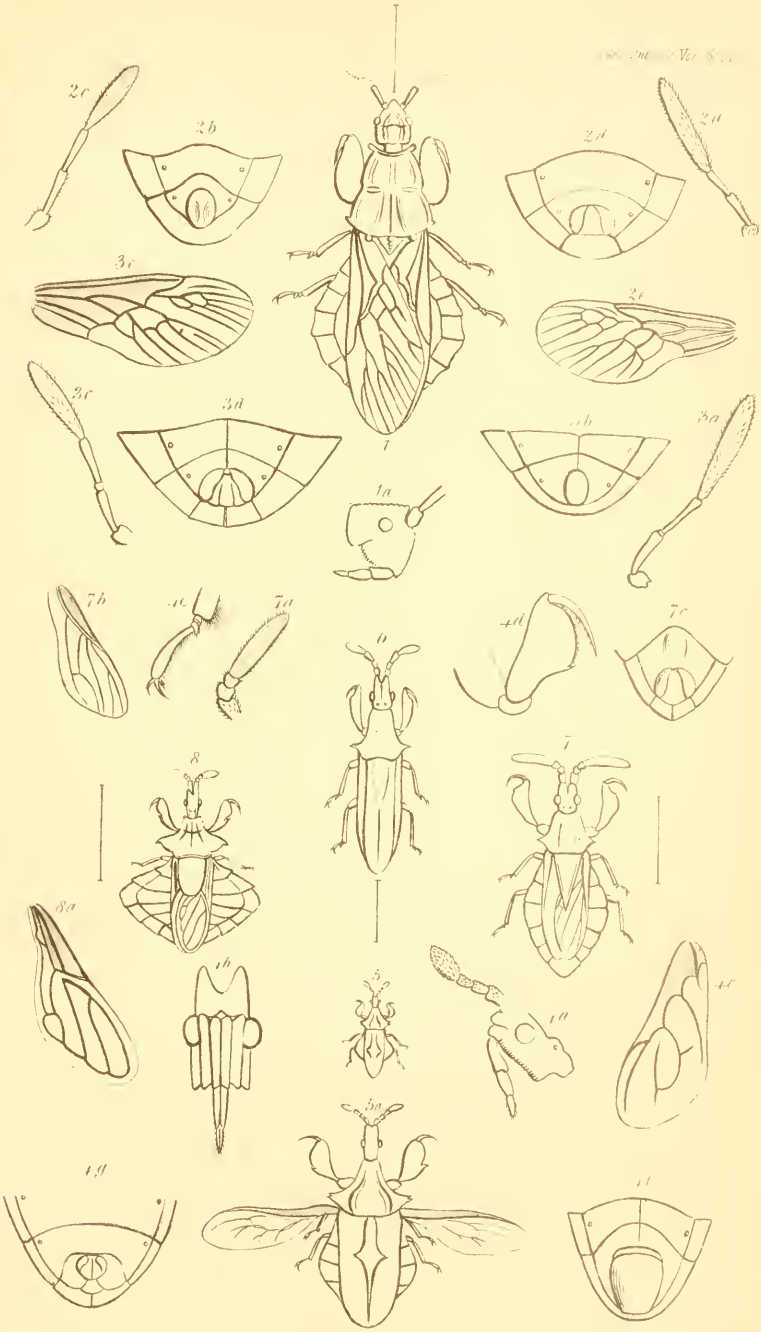
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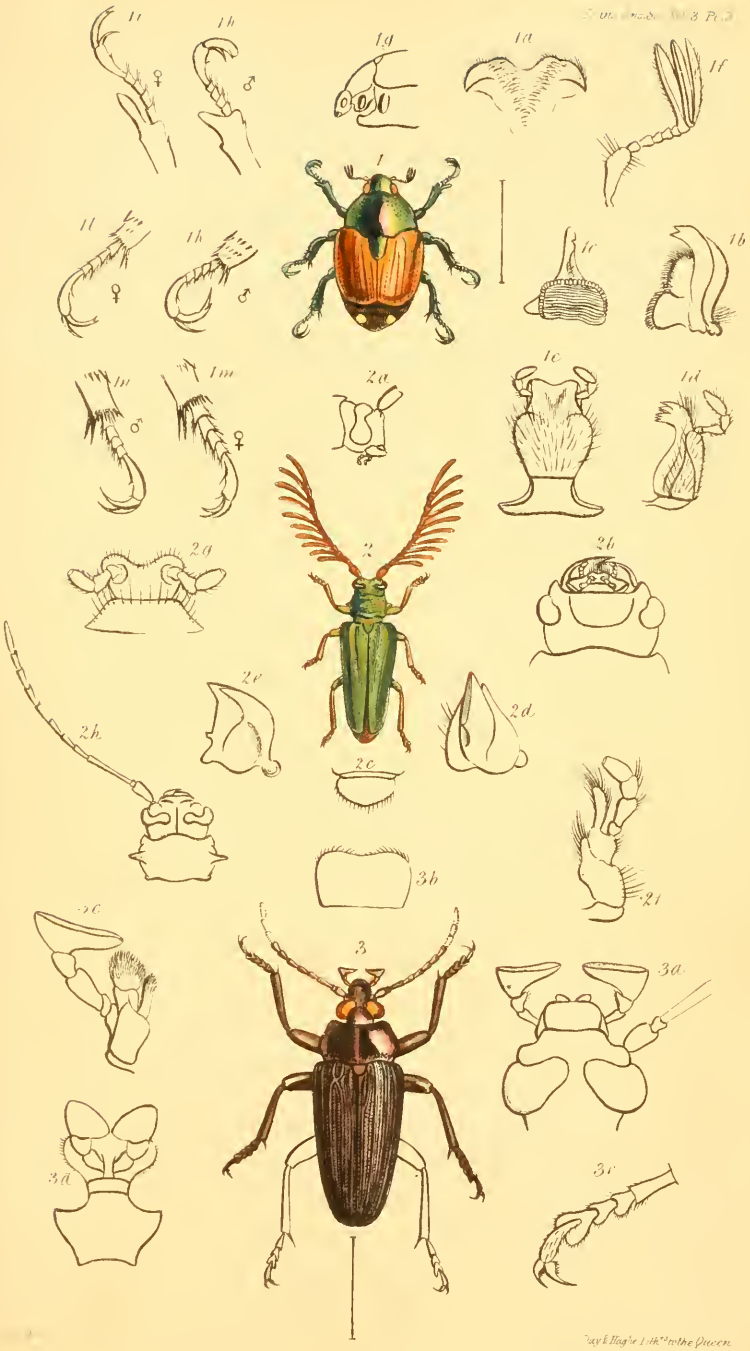

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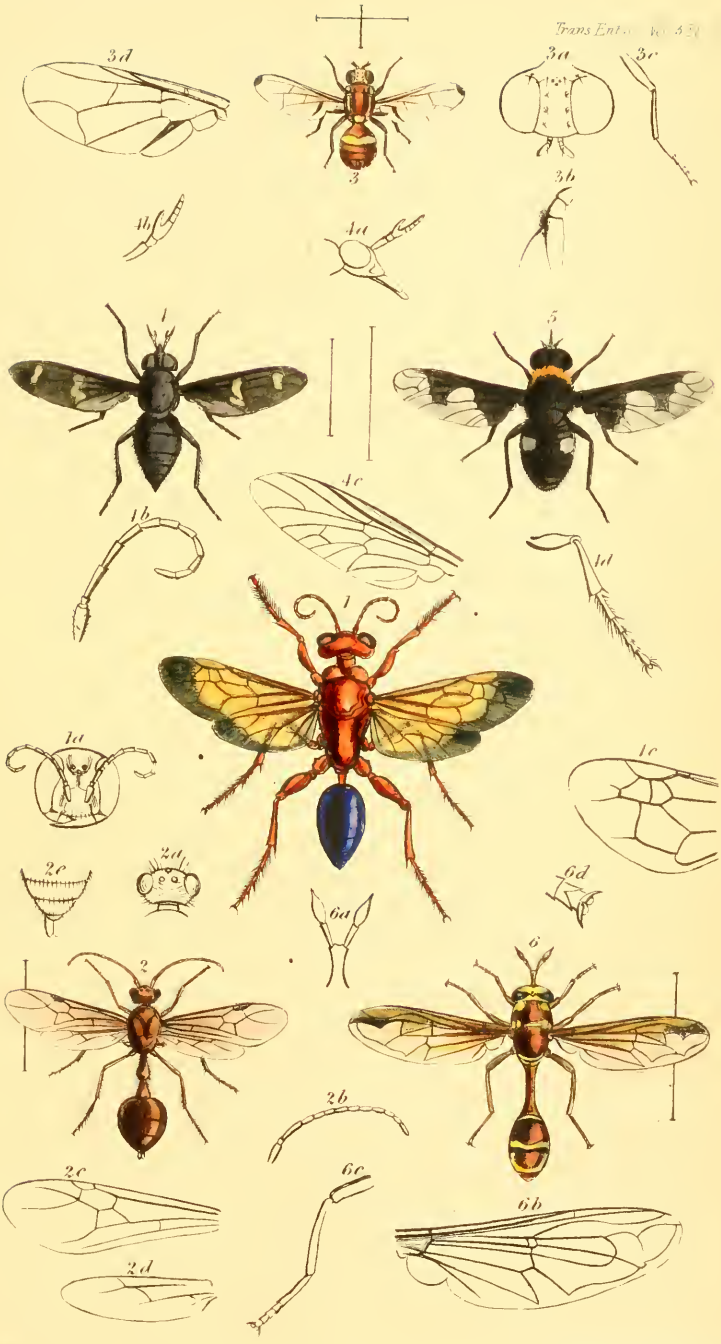
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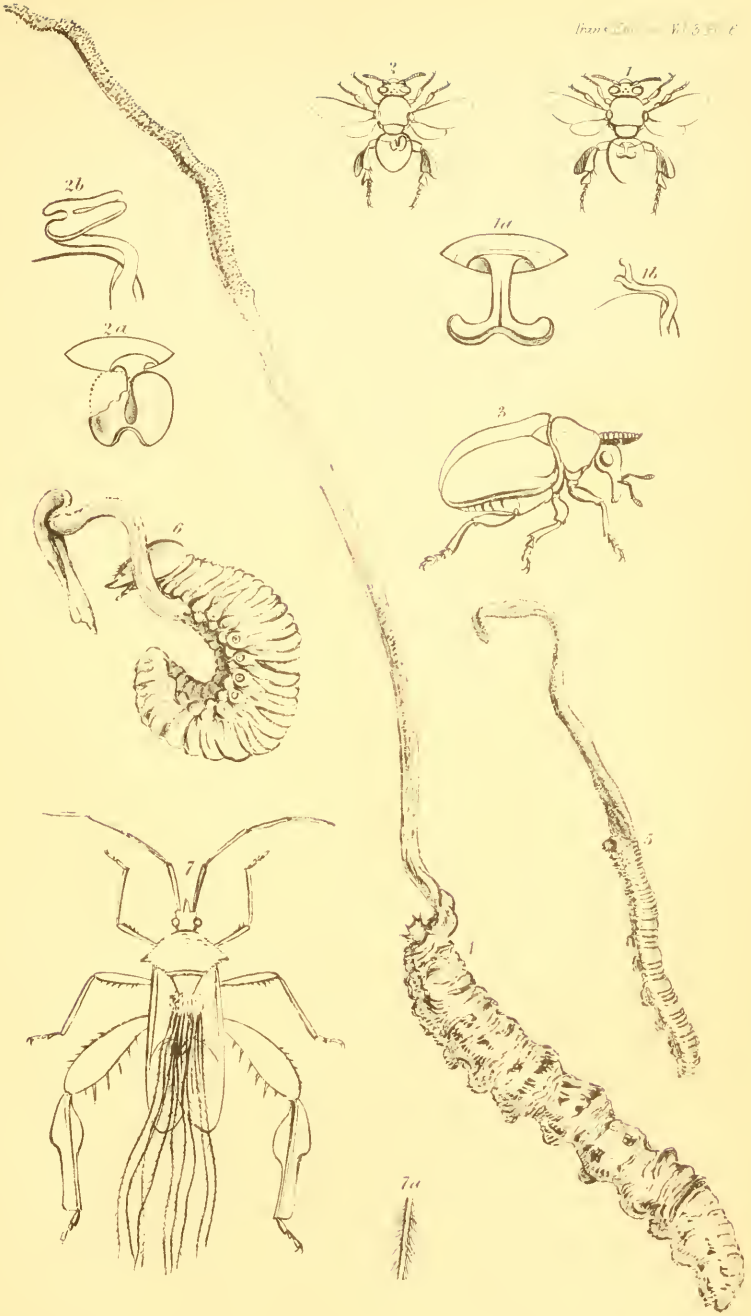
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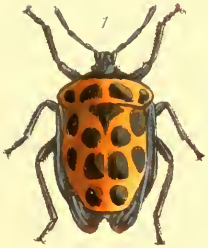

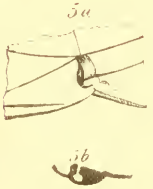

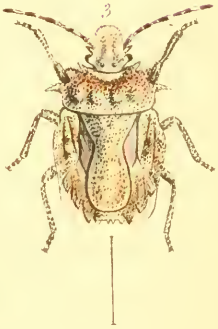

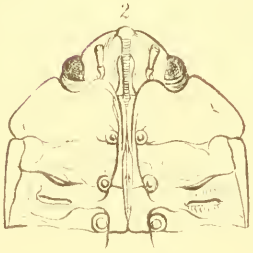

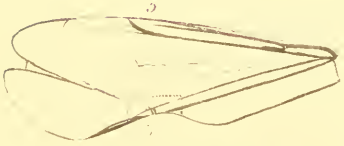

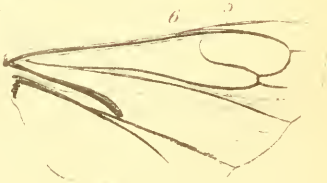

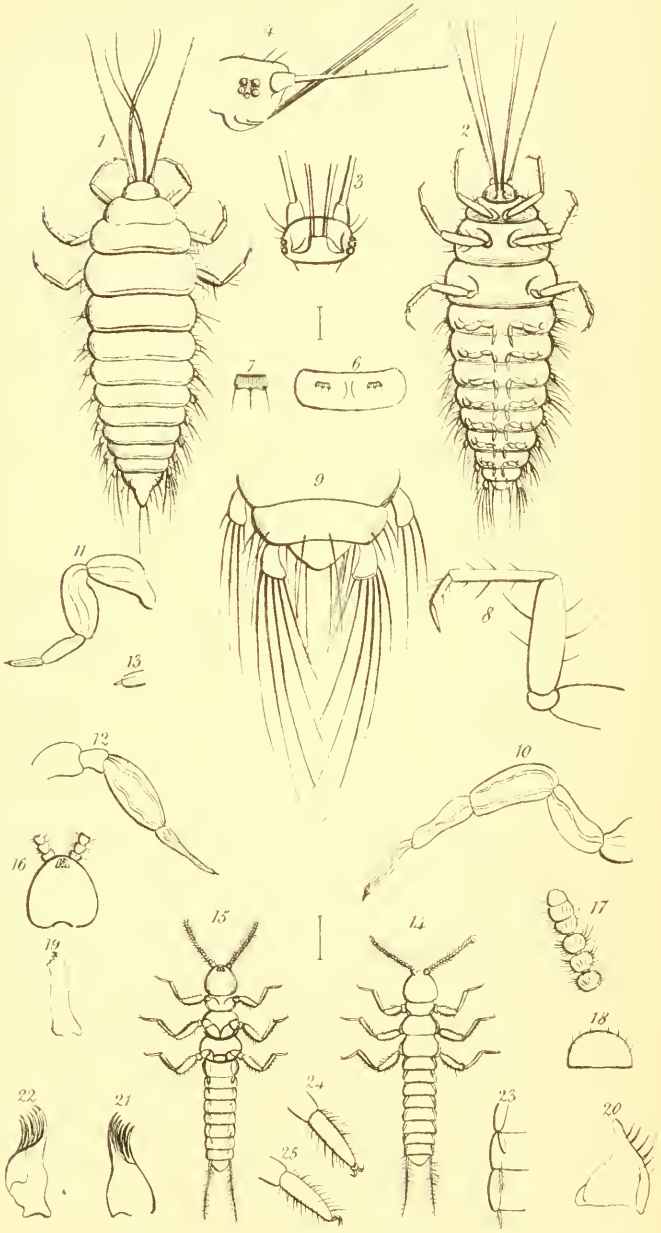
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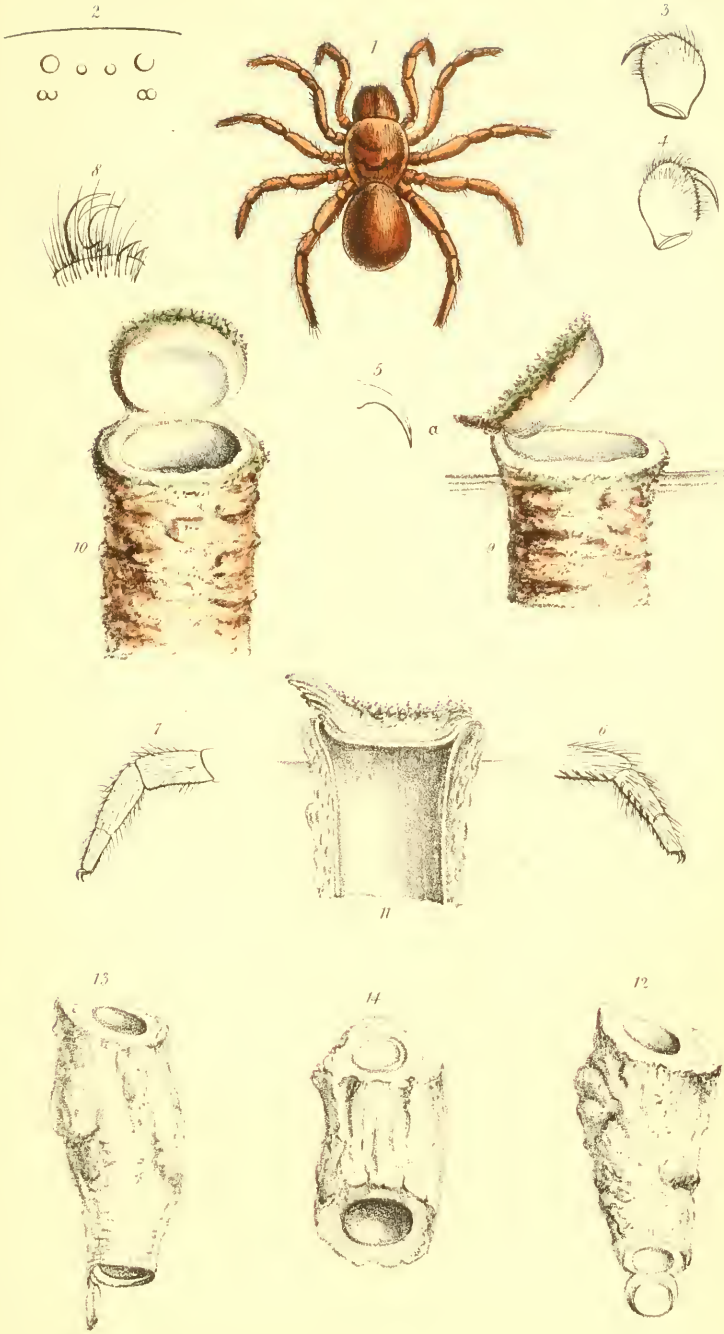

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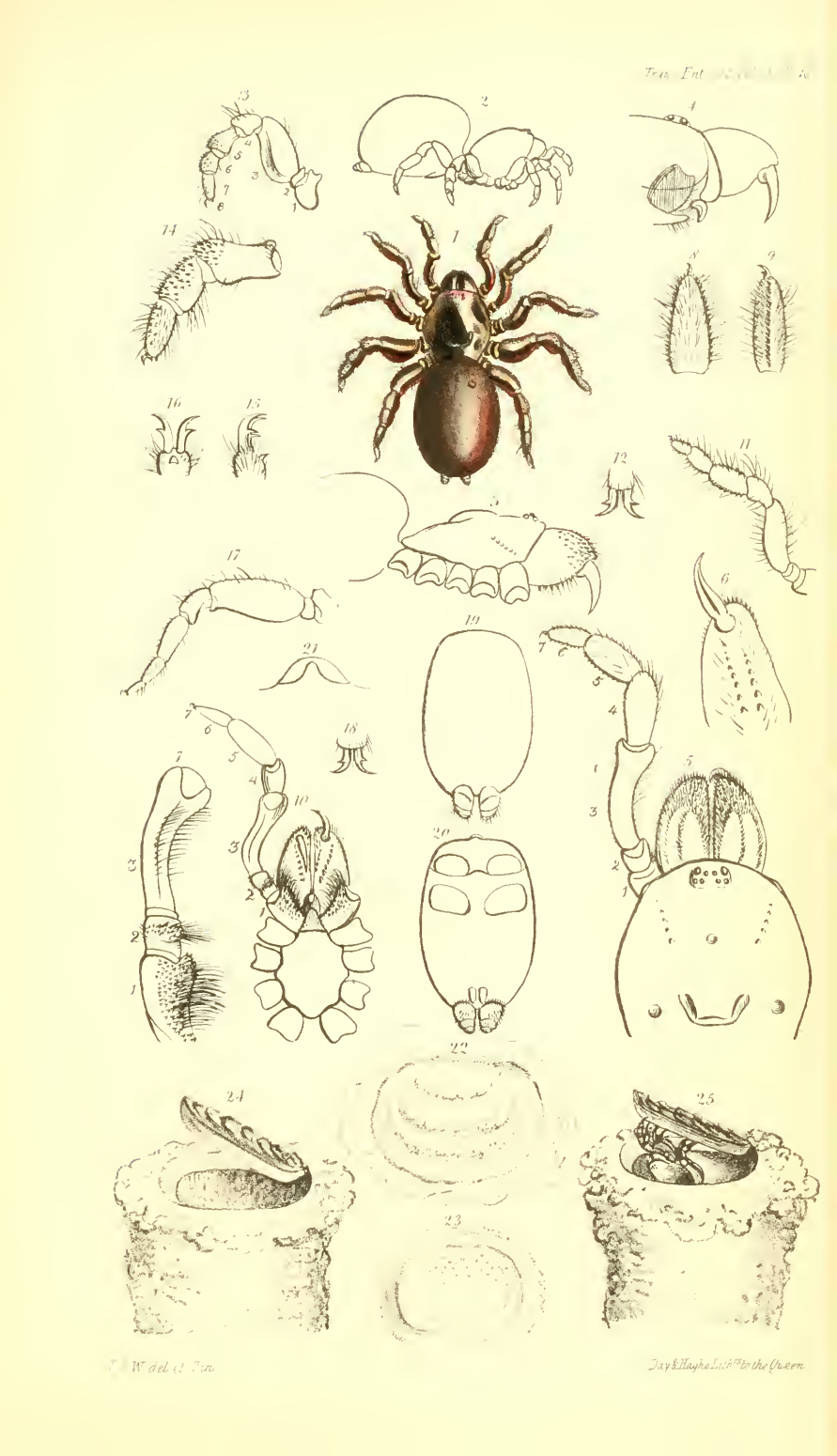
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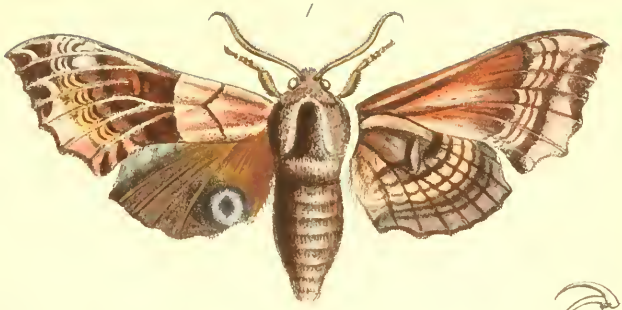
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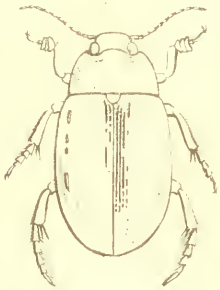
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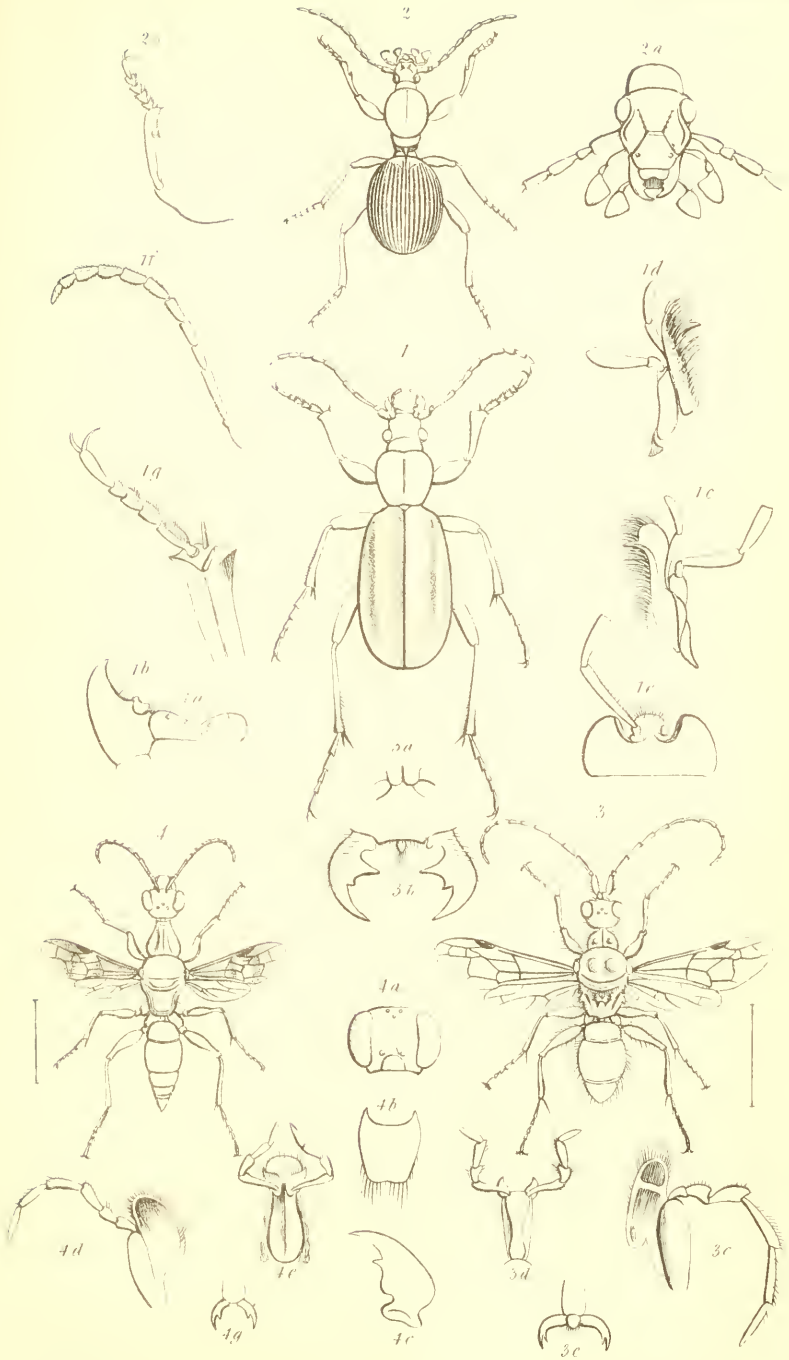
2
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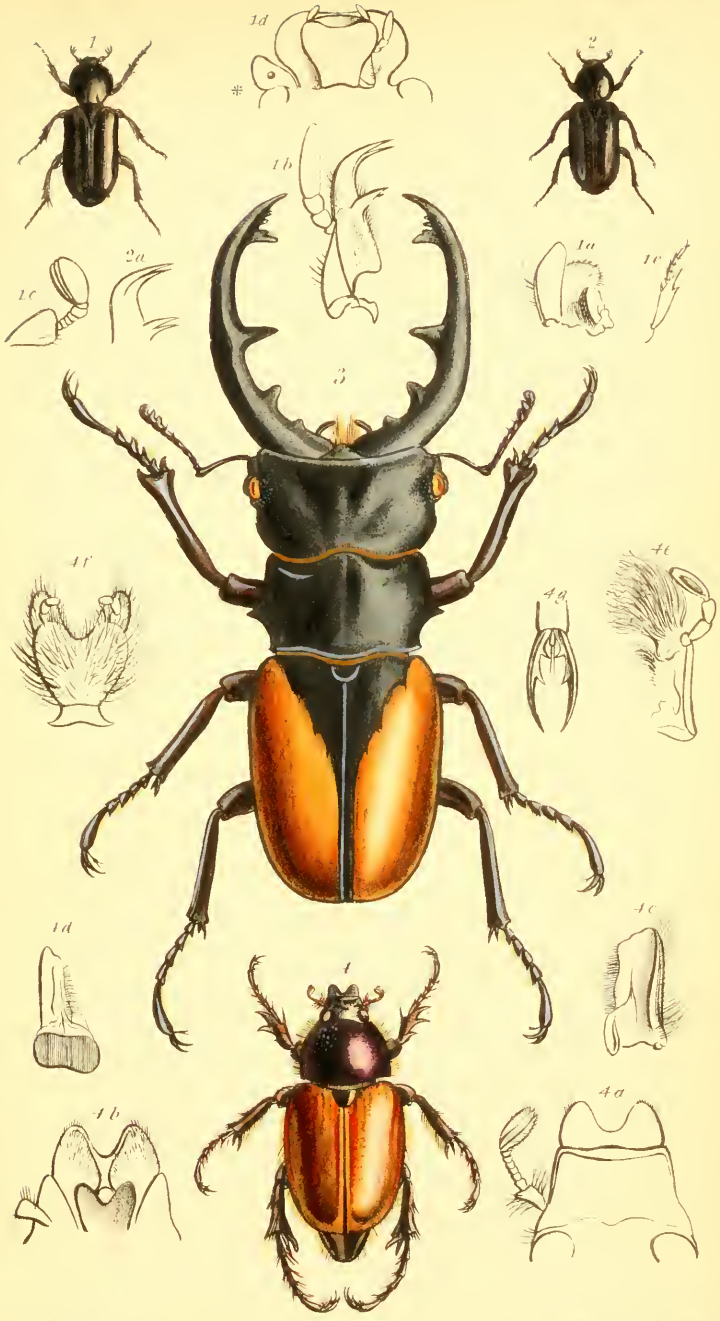
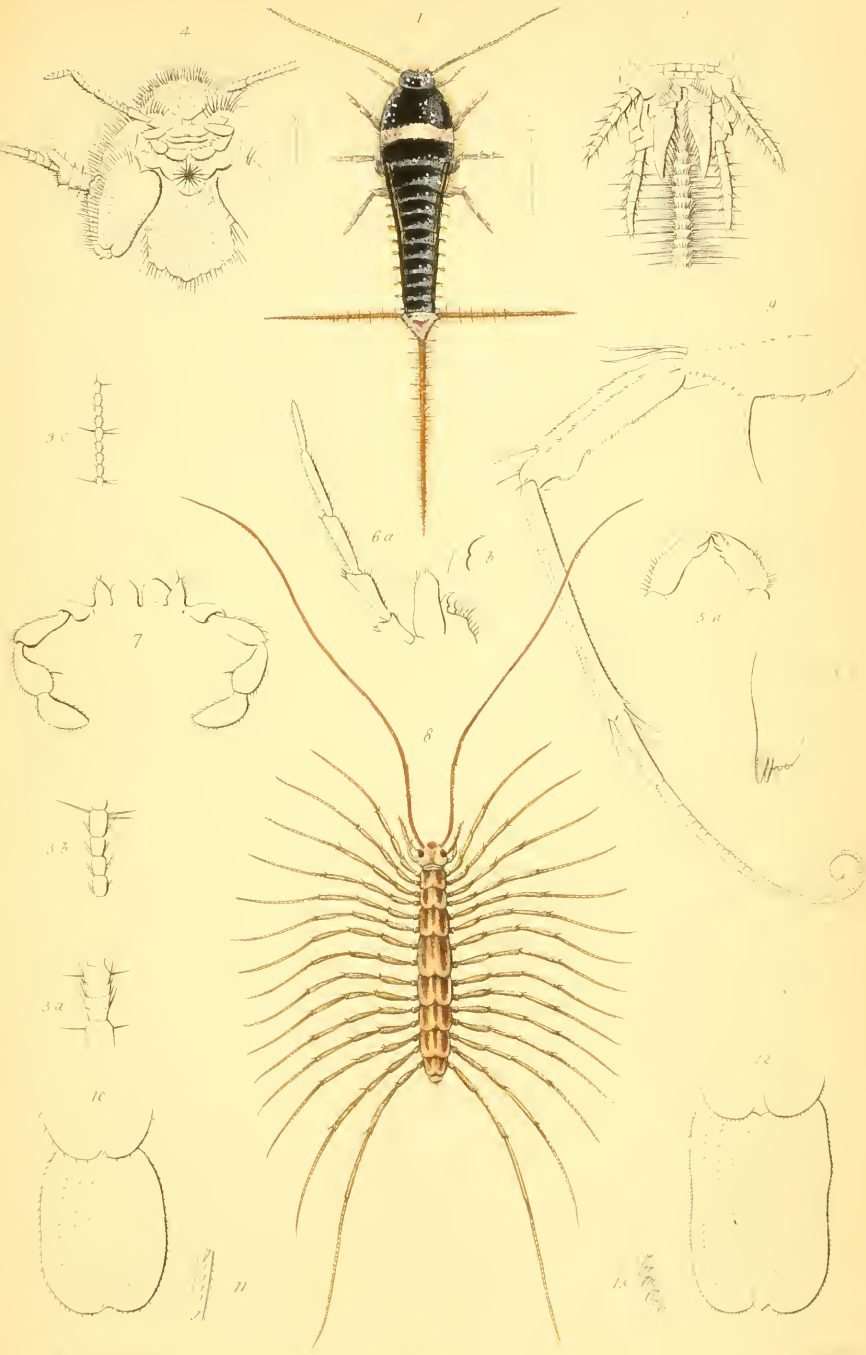


W. W. S. & J. C. W. del.

Lith. Hashe lith. to the queen.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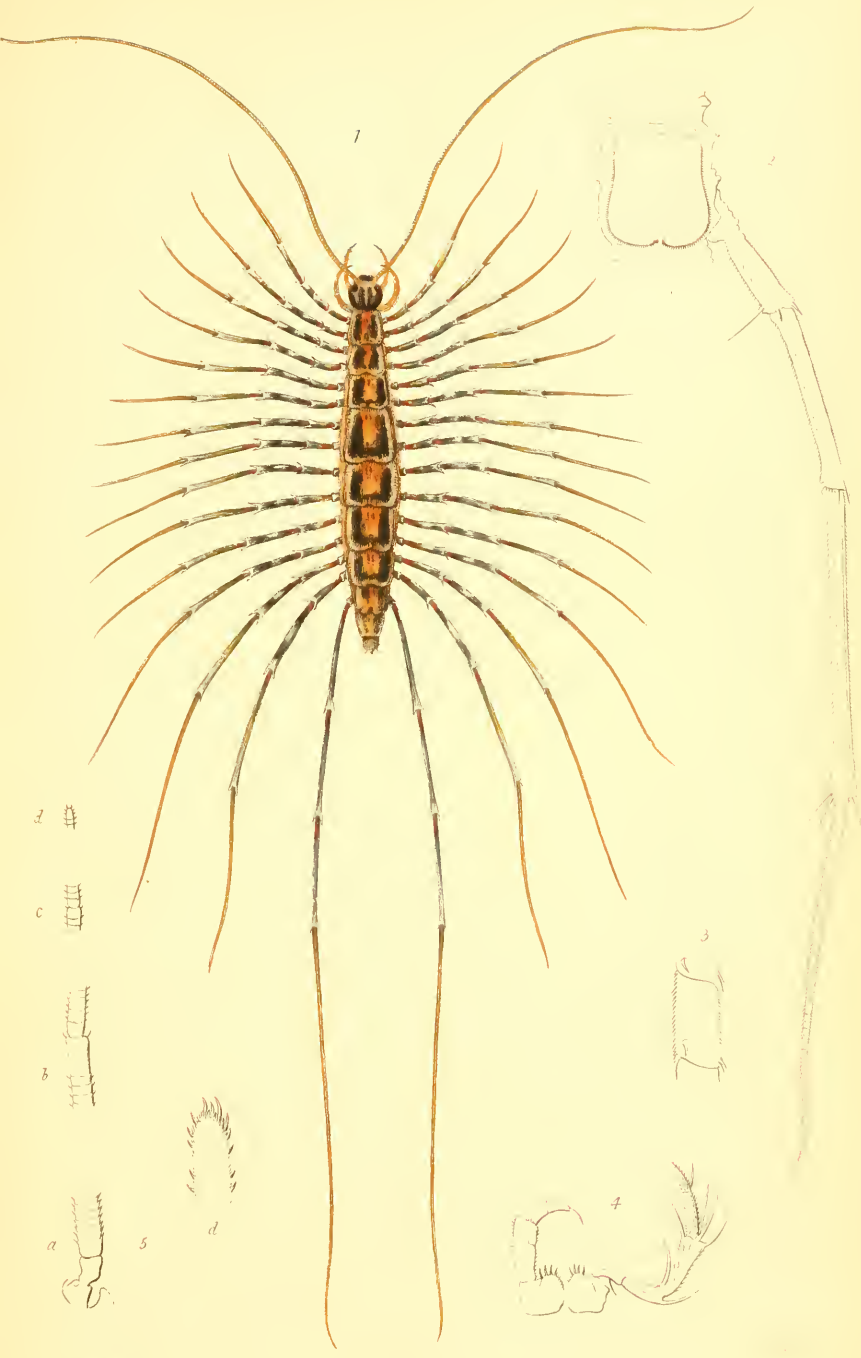
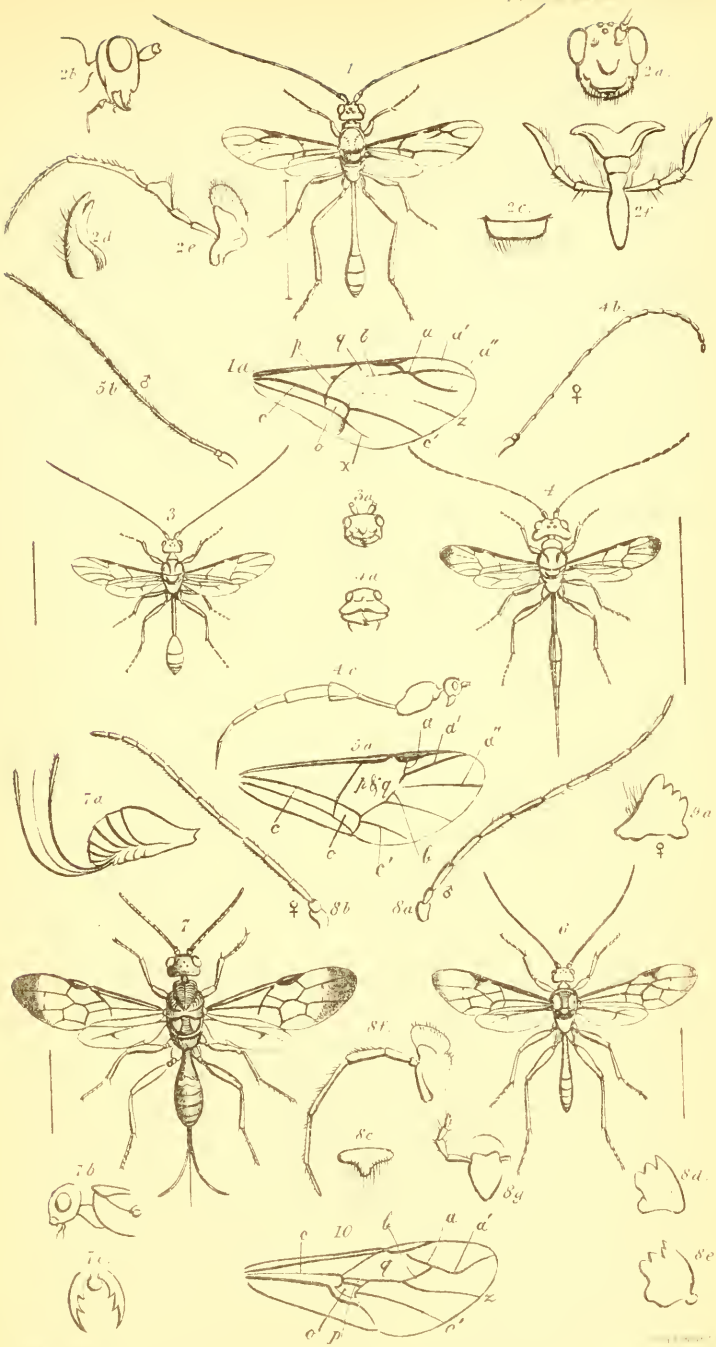


R. Tomlinson del.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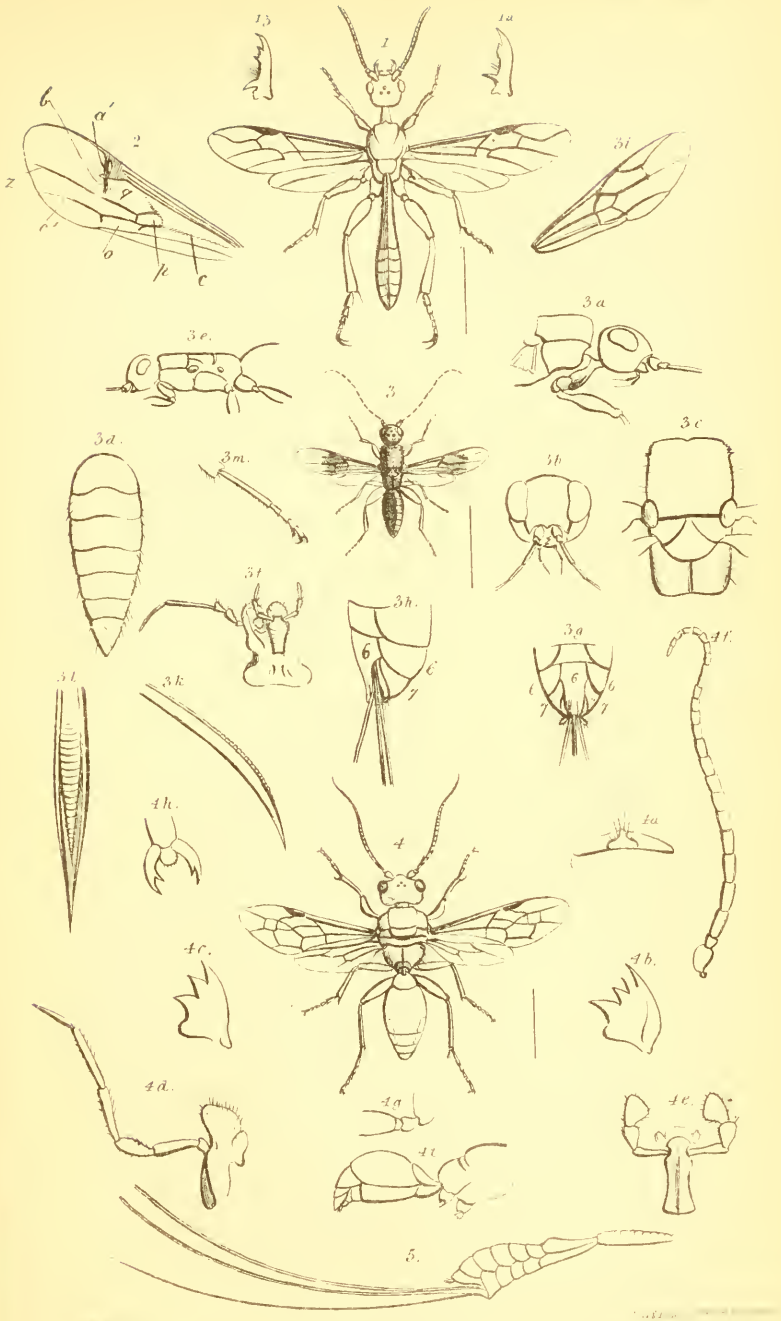
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